Psychology-Notes on foundation of psychology

Psychology: Psychological Research Placement (Murdoch University)

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INTRODUCTION TO PSYCHOLOGY

Unit 1: SCOPE & METHODS of PSYCHOLOGY

Scope of Psychology:

The field of psychology can be understood by various subfields of psychology.

1. Physiological Psychology:

In the most fundamental sense, human beings are biological organisms. Physiological functions and the structure of our body work together to influence our behaviour. Biopsychology is the branch that specializes in the area of how our sensations are related to our behaviour.

2. Developmental Psychology:

Here the studies are with respect to how people grow and change throughout their life from prenatal stages, through childhood, adulthood and old age. Developmental psychologists work in a variety of settings like colleges, schools, healthcare centres, business centres, government and non-profit organizations, etc. They are also very much involved in studies of the disturbed children and advising parents about helping such children.

3. Personality Psychology:

This branch helps to explain both consistency and change in a person's behaviour over time, from birth till the end of life through the influence of parents, siblings, playmates, school, society and culture. It also studies the individual traits that differentiate the behaviour of one person from that of another person.

4. Health Psychology:

This explores the relations between the psychological factors and physical ailments and disease. Health psychologists focus on health maintenance and promotion of behaviour related to good health such as exercise, health habits and discouraging unhealthy behaviours like smoking, drug abuse and alcoholism.

Health psychologists work in healthcare setting and also in colleges and universities where they conduct research. They analyse and attempt to improve the healthcare system and formulate health policies.

5. Clinical Psychology:

It deals with the assessment and intervention of abnormal behaviour. As some observe and believe that psychological disorders arise from a person's unresolved conflicts and unconscious motives, others maintain that some of these patterns are merely learned

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responses, which can be unlearned with training, still others are contend with the knowledge of thinking that there are biological basis to certain psychological disorders, especially the more serious ones. Clinical psychologists are employed in hospitals, clinics and private practice. They often work closely with other specialists in the field of mental health.

6. Counselling Psychology:

This focuses primarily on educational, social and career adjustment problems. Counselling psychologists advise students on effective study habits and the kinds of job they might be best suited for, and provide help concerned with mild problems of social nature and strengthen healthy lifestyle, economical and emotional adjustments.

They make use of tests to measure aptitudes, interests and personality characteristics. They also do marriage and family counselling, provide strategies to improve family relations.

7. Educational Psychology:

Educational psychologists are concerned with all the concepts of education. This includes the study of motivation, intelligence, personality, use of rewards and punishments, size of the class, expectations, the personality traits and the effectiveness of the teacher, the student-teacher relationship, the attitudes, etc. It is also concerned with designing tests to evaluate student performance. They also help in designing the curriculum to make learning more interesting and enjoyable to children.

Educational psychology is used in elementary and secondary schools, planning and supervising special education, training teachers, counselling students having problems, assessing students with learning difficulties such as poor writing and reading skills and lack of concentration.

8. Social Psychology:

This studies the effect of society on the thoughts, feelings and actions of people. Our behaviour is not only the result of just our personality and predisposition. Social and environmental factors affect the way we think, say and do. Social psychologists conduct experiments to determine the effects of various groups, group pressures and influence on behaviour.

They investigate on the effects of propaganda, persuation, conformity, conflict, integration, race, prejudice and aggression. These investigations explain many incidents that would otherwise be difficult to understand. Social psychologists work largely in colleges and universities and also other organizations.

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9. Industrial and Organizational Psychology:

The private and public organizations apply psychology to management and employee training, supervision of personnel, improve communication within the organization, counselling employees and reduce industrial disputes.

Thus we can say that in organizational and industrial sectors not only the psychological effects of working attitude of the employees are considered but also the physical aspects are given importance to make workers feel healthy.

10. Experimental Psychology:

It is the branch that studies the processes of sensing, perceiving, learning, thinking, etc. by using scientific methods. The outcome of the experimental psychology is cognitive psychology which focuses on studying higher mental processes including thinking, knowing, reasoning, judging and decision-making. Experimental psychologists often do research in lab by frequently using animals as their experimental subjects.

11. Environmental Psychology:

It focuses on the relationships between people and their physical and social surroundings. For example, the density of population and its relationship with crime, the noise pollution and its harmful effects and the influence of overcrowding upon lifestyle, etc.

12. Psychology of Women:

This concentrates on psychological factors of women's behaviour and development. It focuses on a broad range of issues such as discrimination against women, the possibility of structural differences in the brain of men and women, the effect of hormones on behaviour, and the cause of violence against women, fear of success, outsmarting nature of women with respect to men in various accomplishments.

13. Sports and Exercise Psychology:

It studies the role of motivation in sport, social aspects of sport and physiological issues like importance of training on muscle development, the coordination between eye and hand, the muscular coordination in track and field, swimming and gymnastics.

14. Cognitive Psychology:

It has its roots in the cognitive outlook of the Gestalt principles. It studies thinking, memory, language, development, perception, imagery and other mental processes in order to peep into the higher human mental functions like insight, creativity and problem-solving. The names of psychologists like Edward Tolman and Jean Piaget are associated with the propagation of the ideas of this school of thought.

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Methods of Psychology:

Psychologists use many scientific methods for research purposes to understand various psychological issues more scientifically. These scientific methods reduce bias and errors in understanding various behavioural aspects.

The relevance of these scientific methods extends beyond testing and evaluating theories and hypotheses in psychology. Though there are many such methods used by psychologists, each has its own advantages and disadvantages.

Some of the important methods are:

a. Introspection method

b. Observation method

c. Experimental method

d. Case study method

e. Questionnaire method

f. Interview method

g. Survey method

A. Introspection Method:

Introspection or self-observation may be considered as a old method but it is something we are doing almost constantly in our everyday life. Introspection is a method of studying the consciousness in which the subjects report on their subjective experiences. It is a method that requires long and difficult training. It gives in-depth information about the individual.

In introspection, the subject is taught to achieve a state of "focused attention" in which he can closely observe his own conscious experiences. He will be able to report the smallest possible elements of awareness. Thus the goal of introspection is to learn about the basic building blocks of experience and the principles by which they combine to give us our everyday consciousness.

Limitations:

1. It is not possible to observe one's own behaviour and at the same time experience it. If such an attempt is made, the experience disappears. Thus the subject has to depend upon memory which itself may be subject to distortions, omissions and commissions.

2. The results obtained from introspection are subjective and so lack scientific validity. They cannot be verified and have to be accepted at face value.

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3. The method cannot be used to study children, animals, insane people, feebleminded and those who are not good at verbal expression.

4. Because experiences are unique, they cannot be repeated and so introspection cannot be repeated.

5. Many experiences are either partly or wholly unconscious and cannot be observed consciously and analyzed.

6. All experiences cannot be verbalized.

B. Observation Method:

This is the most commonly used method especially in relation to behavioural science, though observation as such is common in everyday occurrences, scientific observations are formulated in research places. It is systematically planned, recorded and is subjected to check and control its validity and reliability.

In this method we not only ask the subject to report his experiences but also gather information by direct observation of overt behaviour. When observations are carried out under standardized conditions they should be observed with a careful understanding of the units, that is the style of recording observed information and the selection of dependent or related data of observation concerned, then it is called structured observation. But when observation takes place without these consideration it is called unstructured observation.

Structured observation is useful in descriptive studies, while unstructured observation is useful in exploratory studies. Another way of classifying observation is that of participant and non-participant types of observation. In participant observation the observer makes himself a member of the group which is being observed.

In non-participant observation the observer detaches himself from the group that is being observed. Sometimes, it so happens that the observer may observe in such a way that his presence is unknown to the people he is observing. This is called disguised observation.

The method of participant observation has a number of advantages, the researcher can record natural behaviour of the group and he can gather information which cannot be easily obtained; if he stays outside the group, and also he can verify the truth of statements made by the subjects in the context of schedule or questionnaires.

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The other way of classifying observation is that of controlled and uncontrolled observations:

a. Uncontrolled observation:

It is that which takes place in natural setting. Here no attempt is made to use precautional instruments or methods. Here the major aim of this type of observation is to get a spontaneous picture of life of the persons.

b. Controlled observation:

In this, behaviour is observed according to definite prearranged plans involving experimental procedure. Here mechanical or precision instruments are used to aid accuracy and standardization. This provides formulized data upon which generalizations can be built with considerable accuracy. Generally, controlled observation takes place in various experiments which are carried out in labs under controlled conditions.

Limitations:

1. It is expensive with respect to time and money.

2. The information's provided by this method is very less or limited.

3. Sometimes, unforeseen factors may interfere with observation.

Merits:

1. If observation is done accurately, subjective bias is eliminated.

2. The information obtained under this method relates to current happenings. Either past behaviours or future intensions, do not complicate it.

3. This method is independent of the subject willingness to respond and so does not require active participation of the subject. Because of this, the method is especially suitable to subjects which are not capable of giving verbal reports of their thoughts and feelings.

Naturalistic observation method which is the systematic study of behaviour in natural settings, can be used to study the behaviour of animals which are in wild or in captivity. Psychologists use naturalistic observation whenever people happen to be at home, on playgrounds, in classrooms and offices.

In observation method of studies, it is important to count or measure the behaviour. Careful record-keeping ensures accuracy and allows different observers to crosscheck their observations. Crosschecking is necessary to make sure that observations are reliable or consistent from person to person.

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C. Experimental Method:

The experimental method is most often used in laboratory. This is the method of observation of the behaviour or the ability of the individual under controlled condition or fixed circumstances. It is the performing of an experiment that is a tightly controlled and highly structured observation of variables.

The experimental method allows researchers to infer causes. An experiment aims to investigate a relationship between two or more factors by deliberately producing a change in one factor and observing its effect on other factors. The person who conducts the experiment is called the experimenter and the one who is being observed is called the subject.

An experiment begins with a problem. Problem is the relationship which experimenter wishes to study between two or more variables. Then a hypothesis is formed; it is a suggested answer to the problem under investigation, based on the knowledge that existing in the field of study. To test the hypothesis, relationship between variables is examined. Variables are the factors that can change.

There will be two variables. An independent variable is a variable that the experimenter selects. He can control this variable according to the requirements of the experiment. The dependent variable is the factor that varies with the change in the independent variable that is subject's behaviour.

Experimenters will not wait for the behaviour to occur in nature rather the behaviour will be created in situation by presenting a stimuli to the organism. The behaviour that occurs will be co-related with the stimulus.

From this, it is possible to predict the nature and types of response or responses that may occur to a given stimulus. The changes observed in the dependent variable may be influenced by a number of factors. To establish a clear-cut relationship between a stimulus and response, all other possible influences must be eliminated.

Conditions of Experimental Study:

a. The control group

b. The experimental group.

If experiment has to be successful, the subjects (patients/clients) must be selected carefully. This is called sampling. A random sample is one where every member of the population has an equal chance of being selected. When this is not the case, the sample is said to be biased sample (manipulated). A random sample of entire population is not always necessary or even desirable.

For instance, an experimenter may begin by conducting experiment on a particular population and then repeat the experiment on broader or more representative samples.

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Once the experiment has been conducted, the results have to be summarized and a conclusion drawn.

a. Control group provides a base line against which the performance of experimental group can be composed.

b. The group that receives the experimental treatment is called the experimental group (The group that receives no treatment is called the control group).

Limitations:

1. The situation in which the behaviour is studied is always an artificial one.

2. Complete control of the extraneous variables is not possible.

3. All types of behaviour cannot be experimented.

4. Experimental method requires a laboratory and is expensive.

5. We cannot accumulate information from abnormal people using this method.

Merits:

1. The results are clear and straight forward.

2. The results are usually expressed in terms of numbers which makes it convenient for comparison of performance and analysis.

3. The experiment can be replicated by other researches and verified.

4. Highly dependable cause-effect relationships can be established.

D. Case Study (History) Method:

It is a detailed description of a particular individual. It may be based on careful observation or formal psychological testing. It may include information about the person's childhood dreams, fantasies, experiences, relationships and hopes that throw light into the person's behaviour.

Case studies depend on client's memories of the past and such memories are highly reliable to understand the problems. As case studies focus on individuals, so we cannot generalize about human behaviour.

E. Questionnaire Method:

Questionnaire is an instrument of data collection. It is a method of data collection through which both qualitative as well as quantitative data can be collected by formulating a set of interrelated questions.

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A questionnaire consists of a number of questions printed or typed in a definite order, one set of forms to which the respondents are supposed to answer unaided, by writing the answers in the space provided for the purpose. Where this questionnaire is mailed to the respondents instead of directly administering it is called a mailed questionnaire.

This method of data collection is especially popular when large scale enquiries have to be made. The questionnaire is sent to the person concerned with a request to answer the questions. It consists of a number of questions printed in a definite order which the respondents have to answer. It is considered as the heart of survey operation. In order to construct a good comprehensive questionnaire, some points have to be kept in mind.

They are:

1. The general form

2. The question sequence

3. Question formulation and wording.

1. The general form:

This refers to whether the questionnaire is 'unstructured' or 'structured'. Questionnaire which include definite, concrete and predetermined questions and highly structured questionnaire is one in which all questions and answers are specified and comments by the respondents are held to the minimum.

In an unstructured questionnaire the researcher is presented with a general guide on the type of information to be obtained, but the exact question formulation is not set. Thus the structured questionnaires are simple to administer and relatively inexpensive to analyze.

2. The question sequence:

In order to make a questionnaire effective the question sequence must be clear and should have smooth flow. The relation of one question to another should be readily apparent to the respondent.

The first few questions are particularly important, because they are likely to influence the attitude of the respondent. Questions which are causing very much strain on the memory, personal questions and questions related to personal wealth, etc. should be avoided.

3. Question formulation and wording:

Each question must be clear because any kind of misunderstanding can harm the survey. Questions must be impartial and constructed to the study, the true state of affairs. They should be simple, easily understood and concrete. They should convey only one thought at a time. They should conform as much as possible to the respondent's way of thinking.

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Limitations:

1. The method can only be used when respondents are literate and cooperative.

2. The questionnaire is not flexible because there is no possibility of changing the questions to suit the situation.

3. There is possibility of ambiguous responses or omission of responses to some questions.

4. Interpretation of omissions is difficult.

5. It is difficult to know whether the sample is really representative.

Merits:

1. When the sample is large, the questionnaire method is economical.

2. It is free from the bias of the interviewer.

3. Respondents have adequate time to give well though-out answers.

4. Large samples can be used and so the results can be made dependable and reliable.

F. Interview Method:

This involves collection of data by having a direct verbal communication between two people. Personal interviews are popular but telephone interviews can also be conducted as well. This method is also called face to face method.

In personal interviews an interviewer asks questions generally in a face to face contact with the person being interviewed. In direct personal interview, the investigator collects information directly from the sources concerned. This has to be used when intensive investigation is required.

But in some cases, an indirect examination is conducted where the interviewer cross-examines other persons who are supposed to have knowledge about the problem under investigation. This is used where ever it is not possible to directly contact the required person to be interviewed.

Types of Interview:

a. Structured interview involves the use of predetermined questions and standardized techniques of recording. The interviewer follows a rigid procedure asking questions in a framed prescribed order.

b. Unstructured interview is flexible in its approach to questioning. Here it does not follow the system of predetermined questions and standardized techniques of recording the data. Here the interviewer is allowed much greater freedom to ask supplementary

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questions or to omit some questions if required and he may change the sequence of questions.

He also has a freedom while recording responses, whether to include some aspects and exclude others. This may lead to lack of comparability and also difficult in analyzing the responses.

Other types of interviews are:

i. Focused interview

ii. Clinical interview

iii. Non-directive interview.

i. Focused interview:

In focused interviews the attention is paid on a given experience, and its effects on the respondent. This is generally used in developing the hypotheses and constitutes a major type of unstructured interview.

ii. Clinical interview:

In clinical interviews concern is given to the feelings or motivations of individuals life experiences. Here the interviewer simply encourages the respondent to talk about the given topic with a minimum of direct questioning.

iii. Non-directive interview:

The researcher acts as a catalyst to a comprehensive expression of the subject's feelings, belief and of the frame, of reference within which such feelings which are expressed by the subjects personal significance.

Limitations:

1. It is a very expensive method.

2. Interviewer bias as well as respondents bias may operate while gathering information.

3. Certain types of respondents may not be available for interviews.

4. This method is relatively time consuming.

5. Because the interviewer is present on the spot, the respondent may become overstimulated and give imaginary information just to make the interview more interesting.

6. Selecting, training and supervising the field staff is very complex.

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Advantages:

1. More information about the subject can be obtained in greater depth. The interviewer can obtain a perfect idea about the subject through other means of assessing. As the person is directly accessible he can use other means of communication to assess the individual.

2. First hand information can be collected about the subject's background, economic and educational considerations.

3. The overall personal aspect of an individual can also be assessed.

G. Survey Method:

This method involves in asking large numbers of individuals to complete the given questionnaires or through interviews by interviewing people directly about their experiences, attitudes or opinions.

That is for example, survey on healthcare reform, or economic reform, voting preferences prior to elections, consumer reactions to various products, health practices, public opinion and complaints with safety regulations and so on. Surveys are often repeated over long period of time in order to trace the shifts in public opinion. Surveys can provide highly accurate prediction when conducted carefully.

H. Testing Method:

This method makes use of carefully devised and standardized tests for measuring attitudes, interest, achievement, intelligence and personality traits. Intelligence tests measure the intellectual capacity of an individual and achievement tests through light on achievement of student in various subjects they are studying.

So by adopting all these methods, psychology collects information about behaviour, which helps us to study the behaviour systematically. There are the different methods used in psychology to study the behaviour.

ORGANISATION & FUNCTIONS OF BRAIN & SPINAL CORD (CENTRAL NERVOUS SYSTEM):

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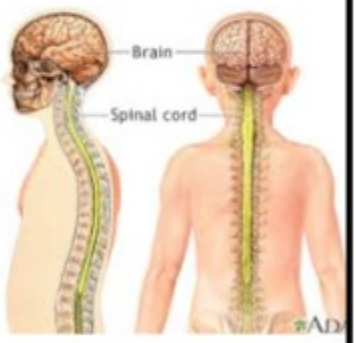
The Central Nervous System (CNS)

The central nervous system is made up of…the **brain** and **spinal cord**.

The brain

- Centre of all conscious awareness
- Key role in decision making – receives information from the senses and controls body responses
- Divided into 2 hemispheres
- Outer layer (cerebral cortex) is highly developed in humans – distinguishes us from animals
- Contains **relay neurons**



The spinal cord

- Extension of the brain
- Responsible for reflex actions e.g. pulling your hand away from a hot plate
- Contains relay neurons
- Receives information from the senses and controls body responses

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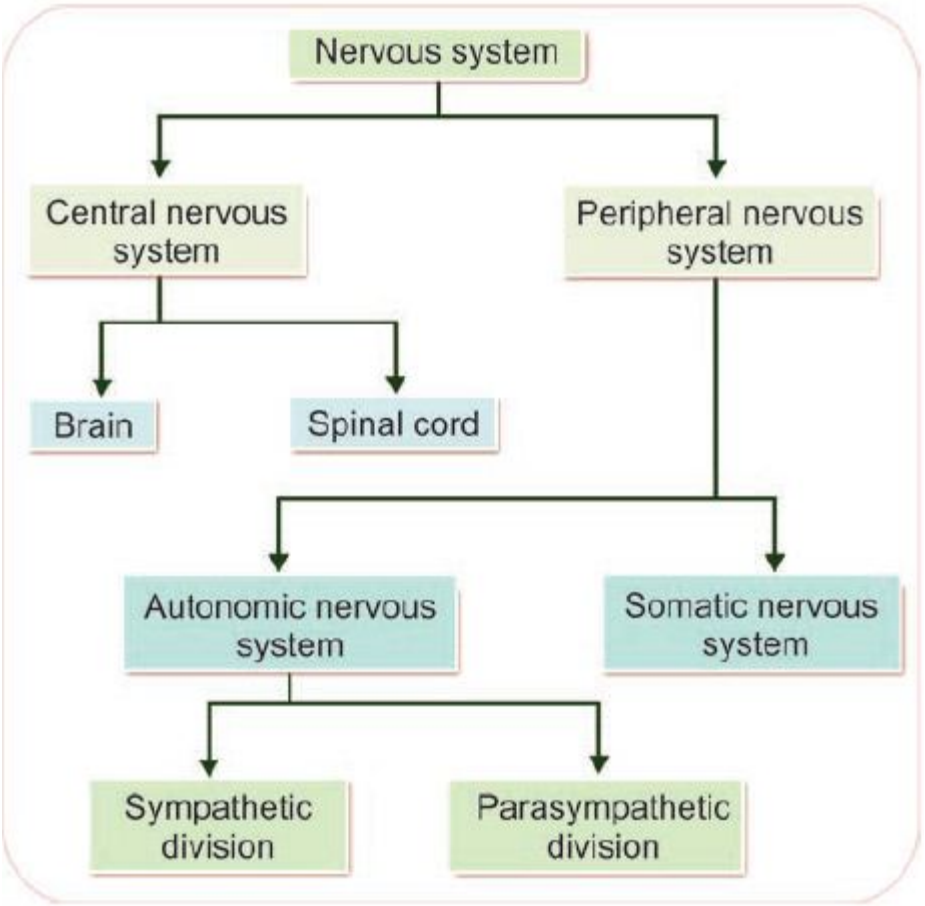

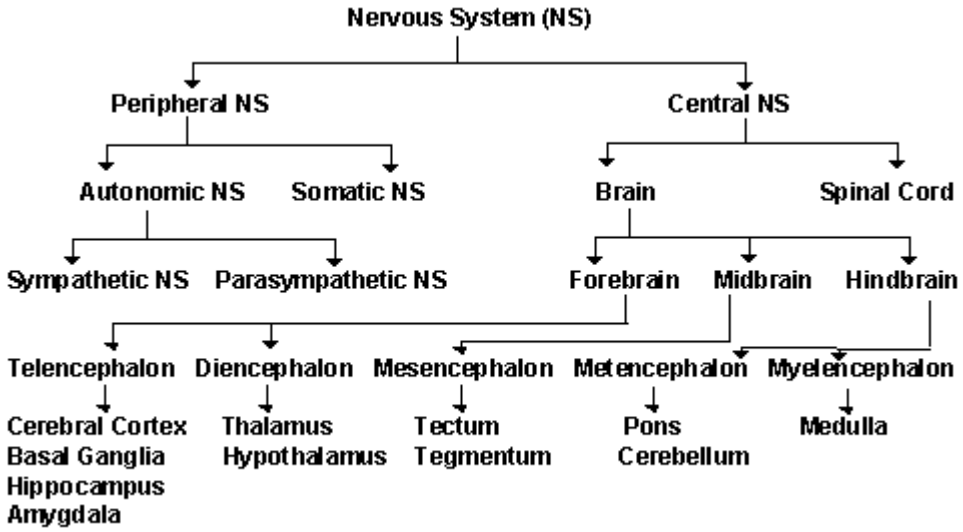

The brain and spinal cord

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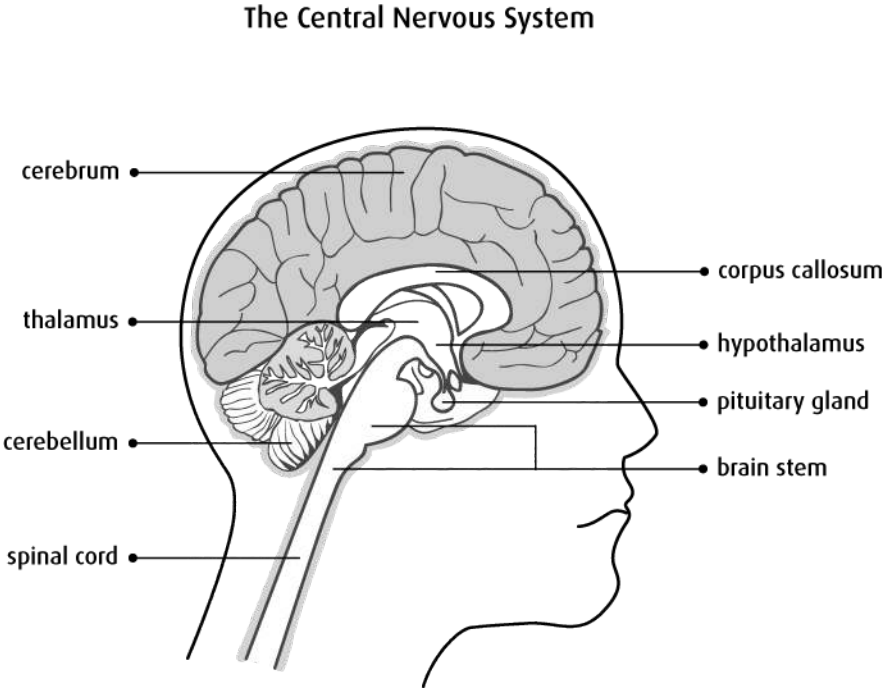
The brain is a complex organ made up of specialized nerve and supportive tissues. It's surrounded by many bones that together form the skull. The part of the skull where the brain sits is called the cranium. The base, or lower part, of the brain is connected to the spinal cord. Together, the brain and spinal cord are known as the central nervous system (CNS). Many nerves send electrical signals to and from the brain and spinal cord.

Structure and function of the brain

The brain is the body's control centre. It constantly receives and interprets nerve signals from the body and sends new signals based on this information. Different parts of the brain control movement, speech, emotions, consciousness and internal body functions, such as heart rate, breathing and body temperature.

The brain has 3 main parts: cerebrum, cerebellum and brain stem.



Types of cells in the brain

The brain is made up of 2 main types of cells:

Nerve cells (neurons) are cells that carry the electrical signals that make the nervous system work. They cannot be replaced or repaired if they are damaged. They are the longest cells in the body.

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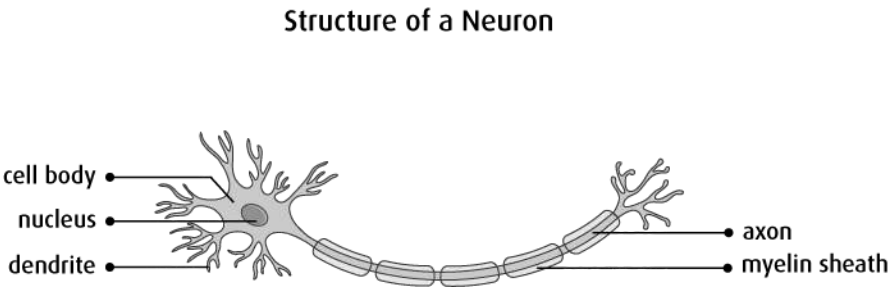

Glial cells (neuroglial cells) are cells that support, feed and protect the nerve cells. The different types of glial cells are:

- astrocytes
- oligodendrocytes
- ependymal cells
- microglial cells

Cerebrum

The cerebrum is the largest part of the brain. It is divided into 2 halves called the left and right cerebral hemispheres. The 2 hemispheres are connected by a bridge of nerve fibres called the corpus callosum.

The right half of the cerebrum (right hemisphere) controls the left side of the body. The left half of the cerebrum (left hemisphere) controls the right side of the body.

The cerebral cortex is the outer, folded part of the brain. It is also called the grey matter. The cerebral cortex is mostly made up of the cell bodies and dendrites of nerve cells (neurons). Cell bodies contain the nucleus and other main parts of the cell. Dendrites are the short branching fibres that receive signals from other nerve cells. The inner part of the cerebrum is called the white matter. It is mostly made up of the long fibres of a nerve cell (called axons) that send signals to and from the brain to the rest of the body. The fatty coating that surrounds axons (called myelin) gives this part of the brain a whitish appearance.

Each hemisphere is divided into 4 sections called lobes. These include the frontal, parietal, temporal and occipital lobes.

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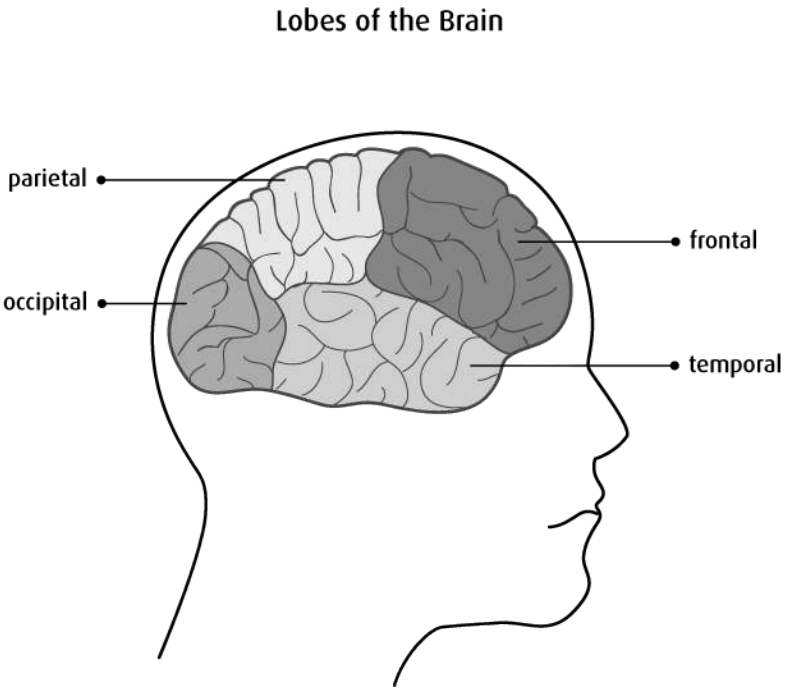

Each lobe has different functions:

The **frontal lobe** controls movement, speech, behaviour, memory, emotions and intellectual functions, such as thought processes, reasoning, problem solving, decision-making and planning.

The **parietal lobe** controls sensations, such as touch, pressure, pain and temperature. It also controls the understanding of size, shape and direction (called spatial orientation).

The **temporal lobe** controls hearing, memory and emotions. The dominant (left side in most right-handed people) temporal lobe also controls speech.

The **occipital lobe** controls vision.

Cerebellum

The cerebellum is located under the cerebrum at the back of the brain. It is divided into 2 parts or hemispheres and also has grey and white matter.

The cerebellum is responsible for:

- movement
- posture
- balance
- reflexes
- complex actions (walking, talking)
- collecting sensory information from the body

Brain stem

The brain stem is a bundle of nerve tissue at the base of the brain. It connects the cerebrum and cerebellum to the spinal cord.

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The brain stem has 3 areas:

- midbrain (also called the mesencephalon)
- pons
- medulla oblongata

The brain stem sends information to and from the other parts of the brain to the rest of the body and controls:

- breathing
- body temperature
- blood pressure
- heart rate
- hunger and thirst
- digestion of food

Cerebrospinal fluid (CSF)

The cerebrospinal fluid (CSF) is a clear, watery liquid that surrounds, cushions and protects the brain and spinal cord. The CSF also carries nutrients in the blood to (and removes waste products from) the brain. It circulates through chambers called ventricles and over the surface of the brain and spinal cord.

Meninges

The brain and spinal cord are covered and protected by 3 layers of tissue (membranes) called the meninges:

- dura mater – thickest outer membrane
- arachnoid layer – middle, thin membrane
- pia mater – inner, thin membrane

The CSF flows in the space between the arachnoid layer and the pia mater. This space is called the subarachnoid space.

Corpus callosum

The corpus callosum is a bundle of nerve fibres that allows communication between the 2 cerebral hemispheres. It is the largest fibre bundle in the brain.

Thalamus

The thalamus is a structure in the middle of the brain that has 2 lobes or sections. It acts as a relay station for almost all information that comes and goes between the brain and the rest of the nervous system in the body.

Hypothalamus

The hypothalamus is a small structure in the middle of the brain below the thalamus. It plays a part in controlling body temperature, hormone secretion, blood pressure, emotions, appetite and sleep patterns.

Pituitary gland

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The pituitary gland is a small, pea-sized organ in the centre of the brain. It is attached to the hypothalamus and makes a number of different hormones that affect other glands of the body's endocrine system. It receives messages from the hypothalamus and releases hormones that control the thyroid and adrenal gland, as well as growth and physical and sexual development.

Pineal gland

The pineal gland is a very small gland in the third ventricle of the brain. It produces the hormone melatonin, which influences sleeping and waking patterns and sexual development.

Choroid plexus

The choroid plexus is a small organ in the ventricles that makes CSF.

Cranial nerves

There are 12 pairs of cranial nerves that perform specific functions in the head and neck, including giving us our sense of smell, sight (vision), hearing, taste, speech, feeling in the face and movement of the muscles in the face, eyes and tongue. One pair of nerves starts in specialized cells in the roof of the nose and another pair starts in the retina of the eye. The other 10 pairs start in the brain stem.

Blood-brain barrier (BBB)

The blood-brain barrier (BBB) is a specialized system of cells lining blood vessels in the brain. The BBB prevents most substances in the blood from passing into the brain and helps maintain a constant environment so the nerve cells in the brain can work properly.

The BBB is made up of very small blood vessels (capillaries) that are lined with thin, flat endothelial cells. In other parts of the body, endothelial cells have small spaces between them that allow substances to move in and out of the capillary so they can reach other cells and tissues. In the brain, the endothelial cells are packed tightly together so substances cannot pass out of the bloodstream into the brain.

Structure and function of the spine

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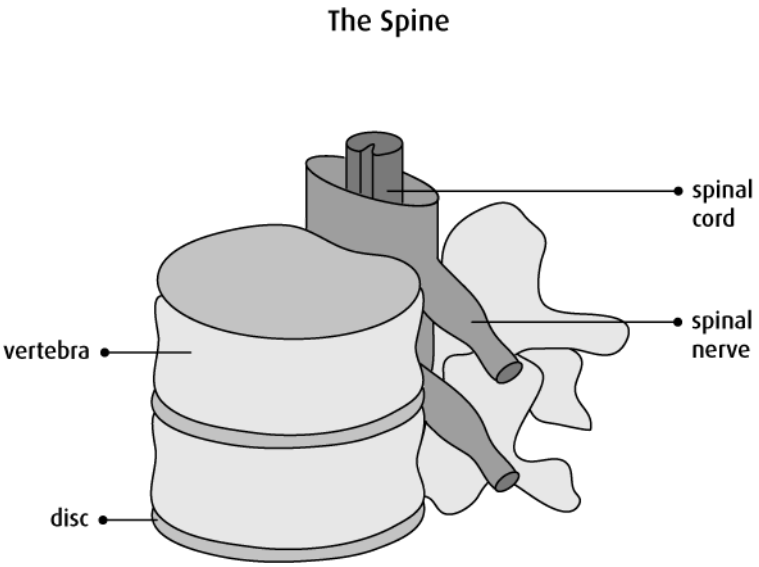

The spine is made up of 26 bones divided into 5 sections. These bones surround and protect the spinal cord. This includes 24 vertebrae (divided into cervical, thoracic and lumbar regions), the sacrum and the coccyx.

Cervical region – These are 7 vertebrae at the top of the spine that run from the base of the skull to the lowest part of the neck.

Thoracic region – These are 12 vertebrae that run from the shoulders to the middle of the back.

Lumbar region – These are 5 vertebrae that run from the middle of the back to the hips.

Sacrum – This is a large section of fused vertebrae at the base of the spine.

Coccyx (tail bone) – This is a small, thin section of fused vertebrae at the end of the spine.

Between the vertebrae are the discs (intervertebral discs).

Disc – A layer of cartilage found between the vertebrae. Discs cushion and protect the vertebrae and spinal cord.

Spinal cord

The spinal cord is a thick column of nerves surrounded by vertebrae that runs from the brain stem to the lumbar region of the spine. Like the brain, the spinal cord has both grey and white matter. The spinal cord sends information between the brain and most of the body through the spinal nerves.

Spinal nerves

Pairs of spinal nerves exit the vertebrae along the length of the spinal cord. At the lumbar region, the spinal cord branches into a group of spinal nerves that exit the lumbar vertebrae

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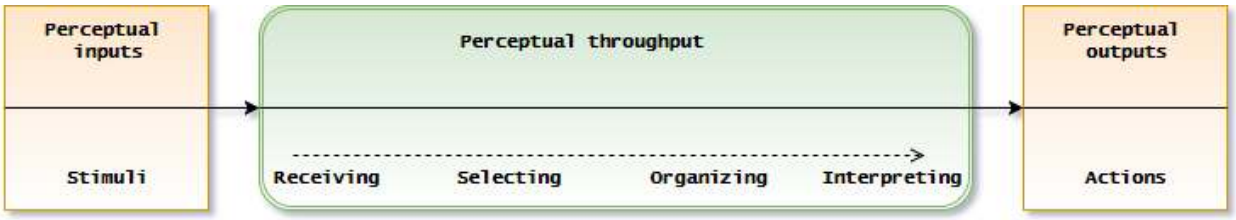
and sacrum. The spinal nerves control body functions like movement, bladder and bowel control and breathing. The spinal nerves are numbered after nearby vertebrae.

What is the process of Perception?

Perceptional Process : Perception is a process consisting of several sub processes. We can take an input – throughput output approach to understand the dynamics of the perceptual process. This approach emphasizes that there is input which is processed and gives output. The stimuli in the environment-objects, events, or people-can be considered as the perceptual inputs. The actual transformation of these inputs through the perceptual mechanism of selection, organization, and interpretation can be treated as the throughputs, and the resultant opinions, feelings, attitudes etc. which ultimately influence our behavior, can be viewed as the perceptual outputs. This simplified process of perception in fig:



Simplified process of perception

1. Figure is a simplified version of perceptual process. It does not present the whole factors which go in input-throughout output process of perception. Fig: 2 presents a comprehensive view of process of perception.

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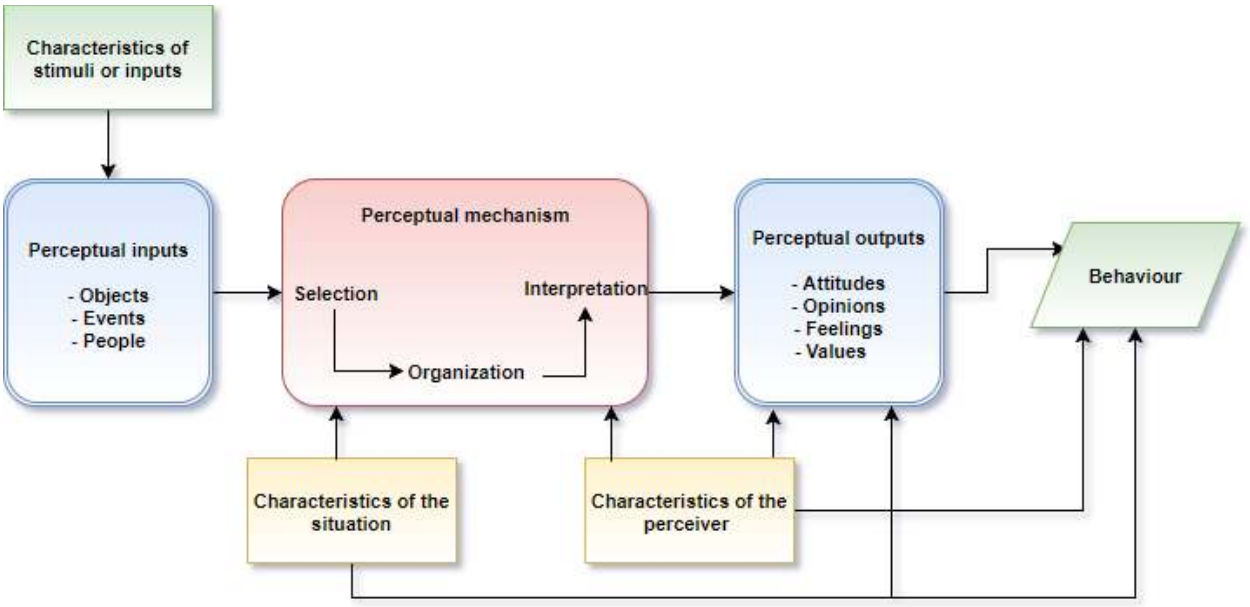

Figure 2. of perceptual process presents three basic sub processes or elements of perception. These are existence of stimuli, perceptual mechanism, and perceptual outputs. Perceptual outputs along with other determinants of human behavior affect and shape behavior. Let us we how perceptual process works in terms of its three basic elements.

Perceptual Inputs : strictly speaking, perceptual inputs in the form of stimuli are not part of actual perceptual process through these are necessary for the occurrence of perception. Stimuli may be in the form of objects, events, or people. Thus everything in the setting where events occur, or which contributes to the occurrence of events, can be termed as perceptual input. Further the characteristics of stimuli are important as these affect the extent to which the perceiver is attracted to these which affects the selection of stimuli for perception along with other variables affecting selection of stimuli like like perceiver's characteristics and situational variables. When the perceiver interacts with a stimulus, sensation takes place which, we have seen earlier starts perceptual process.

Perceptual Mechanism: Perceptual mechanism involves three elements- selection of stimuli, organization of stimuli, and interpretation of stimuli.

Selection of stimuli: After receiving the stimuli from the environment, some are selected for further processing while others are screened out because it is possible for a person to selected all stimuli which he sees in the environment. There are two types of factors which affect selection of stimuli. These are external and related to stimuli and internal related to the perceiver. These external and internal factors are of several types. We shall discuss these factors and their impact on the selection of stimuli in the subsequent section of this chapter dealing with perceptual selectivity.

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Organization of Stimuli: After the stimuli are received, these are organized in some form in order to make sense out of that. The various forms of organizing stimuli are figure-ground perceptual grouping, simplification, and closer.

Interpretation of Stimuli: The perceptual inputs that have been organized will have to be interpreted by the perceiver so that he can sense and extract some meaning of what is going on in the situation. People interpret the meaning of what they have selectively perceived and organized in terms of their own assumptions of people, things and situation. They also become judgmental as well and tend to interpret the thing as good/bad, beautiful/ugly and so on which are quite relative terms. In such a process, there are chances of misinterpretation. Interpretation of stimuli is affected by characteristics of stimuli, situations under which perception takes place, and characteristics of the perceiver. These factors also affect the total perceptual process.

Perceptual Outputs: Based on perceptual mechanism which ends with interpretation of stimuli, perceptual outputs emerge. These outputs may be in the form of covert actions development of attitudes, opinions, beliefs, impression about the stimuli under consideration. These outputs along with other factors affecting human behavior may result in overt behavior. For overt behavior to occur, perception is not the sole decider though it is important. For example, when a person sees an advertisement of a product, he may perceive that the product is good. This perception, however, may not be enough for the person to buy the product (overt behavior). The actual buying may depend on the availability of the product, perceiver's need for product and his propensity and capacity to spend money for buying the product.

Perceptual Process

- The perceptual process consists of six steps: the presence of objects, observation, selection, organization, interpretation, and response.
- Perceptual selection is driven by internal (personality, motivation) and external (contrast, repetition) factors.
- Perceptual organization includes factors that influence how a person connects perceptions into wholes or patterns. These include proximity, similarity, and constancy, among others.

Key Terms

- **factor**: An integral part.

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- **Perception**: That which is detected by the five senses; that which is detected within consciousness as a thought, intuition, or deduction.

Perceptual Process

The perceptual process is the sequence of psychological steps that a person uses to organize and interpret information from the outside world. The steps are:

- Objects are present in the world.
- A person observes.
- The person uses perception to select objects.
- The person organizes the perception of objects.
- The person interprets the perceptions.
- The person responds.

The selection, organization, and interpretation of perceptions can differ among different people. Therefore, when people react differently in a situation, part of their behavior can be explained by examining their perceptual process, and how their perceptions are leading to their responses.

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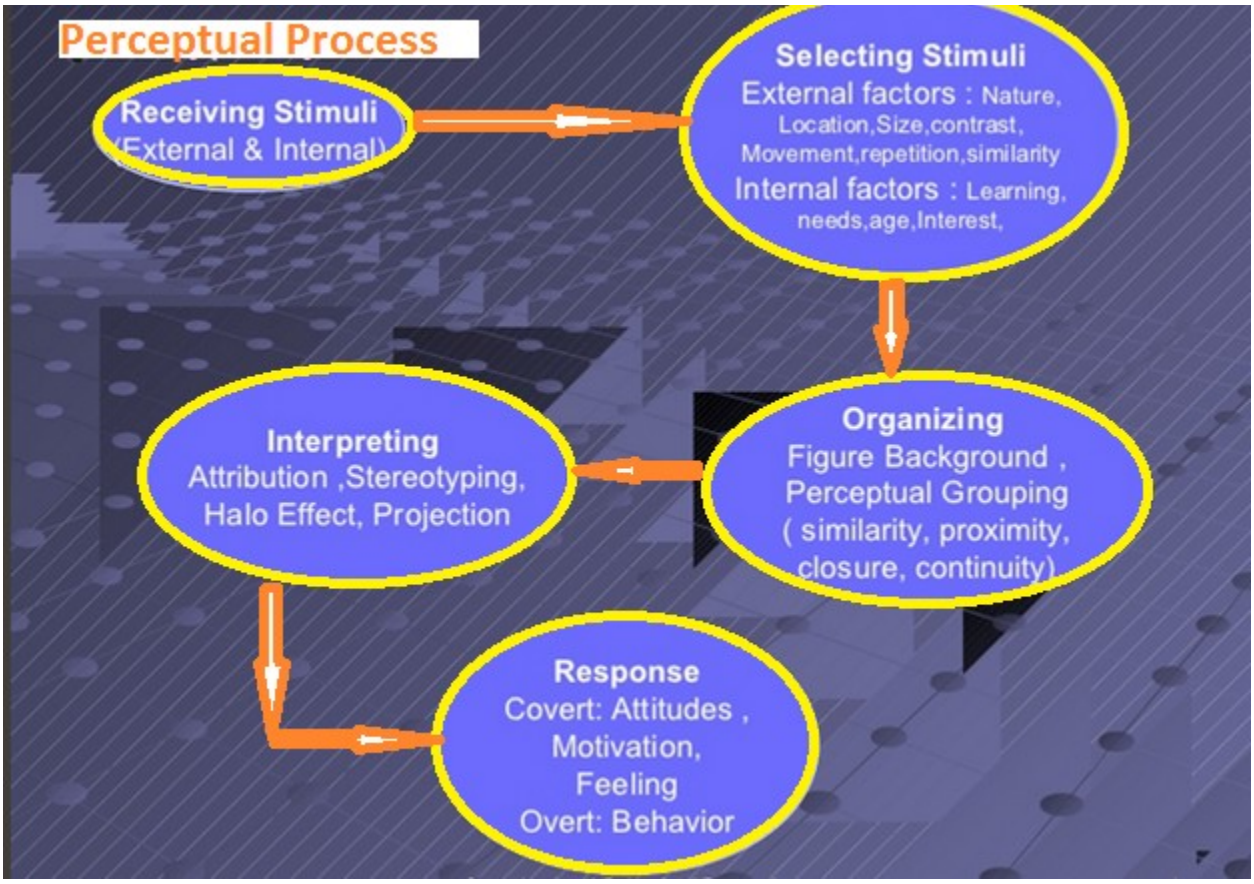

Gestalt Principles of Perceptual Organization

1. **Law of Proximity:** This law describes elements that are closely placed together and thus perceived as a group. For example, placing a particular shape without proximity , just as the Adidas logo in figure 1, but still perceived as separate shapes.

Figure 1: Law of Proximity

2. **Law of Similarity:** This law describes placing similar objects with one another. It could be perceived as a pattern or group. For example, placing two distinct shapes in vertical columns.

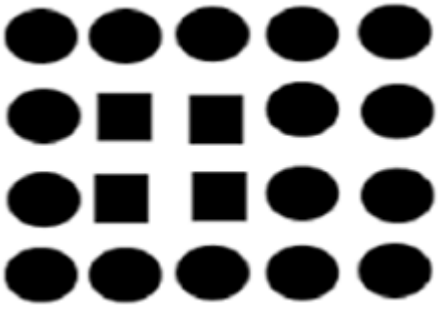

Figure 2: Law of Similarity

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3. **Law of Continuation:** This is described as the compelling movement of the eyes through an object to another object. For example, in the image letter below, the eyes are compelled to follow the curve in the letter to the leaf.

Figure 3: Law of continuation

4. **Law of Closure:** This is described as the incompleteness or a space unenclosed in an object. For example, the panda below shows some incompleteness in its figure.

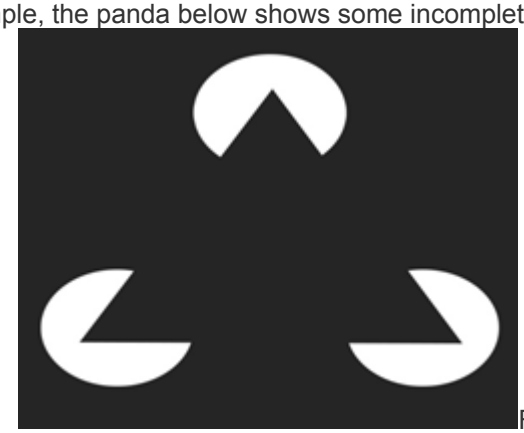

Figure 4: Law of Closure.

5. **Law of Symmetry:** This is described as the regions bounded by some symmetrical borders and they are perceived to be coherent figures. Example of this is the figure below.

Figure 5: Laws of Symmetry.

6. **Law of Simplicity:** Any ambiguous stimuli have the tendency to determined to favor the simplest. An example is shown below in figure 7.

6. **Law of Pragnanz:** This is described as the reduction and organization of the reality of an object to its simplest possible form. Example is shown below.

Figure 7: Law of Pragnanz

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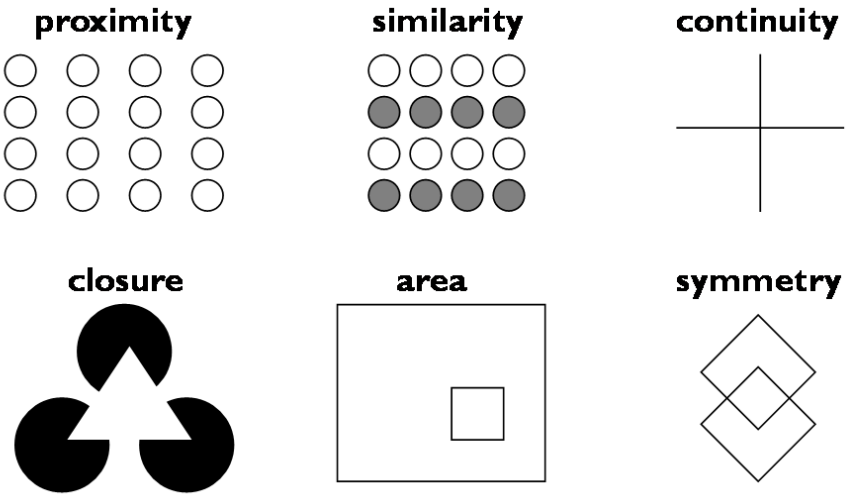
The Gestalt Principles of Grouping

- Gestalt principles explain how eye creates a whole (*gestalt*) from parts



UNIT 3: LEARNING:

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CLASSICAL CONDITIONING
VERSUS
OPERANT CONDITIONING

Classical conditioning was introduced by Ivan Pavlov in early 1900s	Operant Conditioning was found by B.F. Skinner in 1938
Based on involuntary reflexive behavior	Involves voluntary behavioral outcomes
Studies individual's behavior in relation to various internal or external stimuli	Studies behavioral patterns that take place in response to numerous rewards & outcomes
Pavlov's world famous dog experiment helped to establish the theory	Skinner's rat box experiment helped to prove this theory

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Differences b/w Classical and Operant Conditioning

Classical Conditioning

1. Responses are elicited (i.e. reactive).
2. Responses are fixed to stimulus (no choice).
3. Conditioned stimulus (CS): sound, an object, a person.
4. Conditioning is implemented before response.
5. First a stimulus is produced and then the desired behaviour is expected.

Operant Conditioning

1. Responses are emitted by a person (Proactive).
2. Responses are variable in types and degrees (choice).
3. CS is a situation such as office, a social stetting, a specific set of circumstances.
4. Conditioning is is implemented after response.
5. First we get a behaviour pattern and then either by reward or by a avoidance of punishment we reinforce that behaviour.

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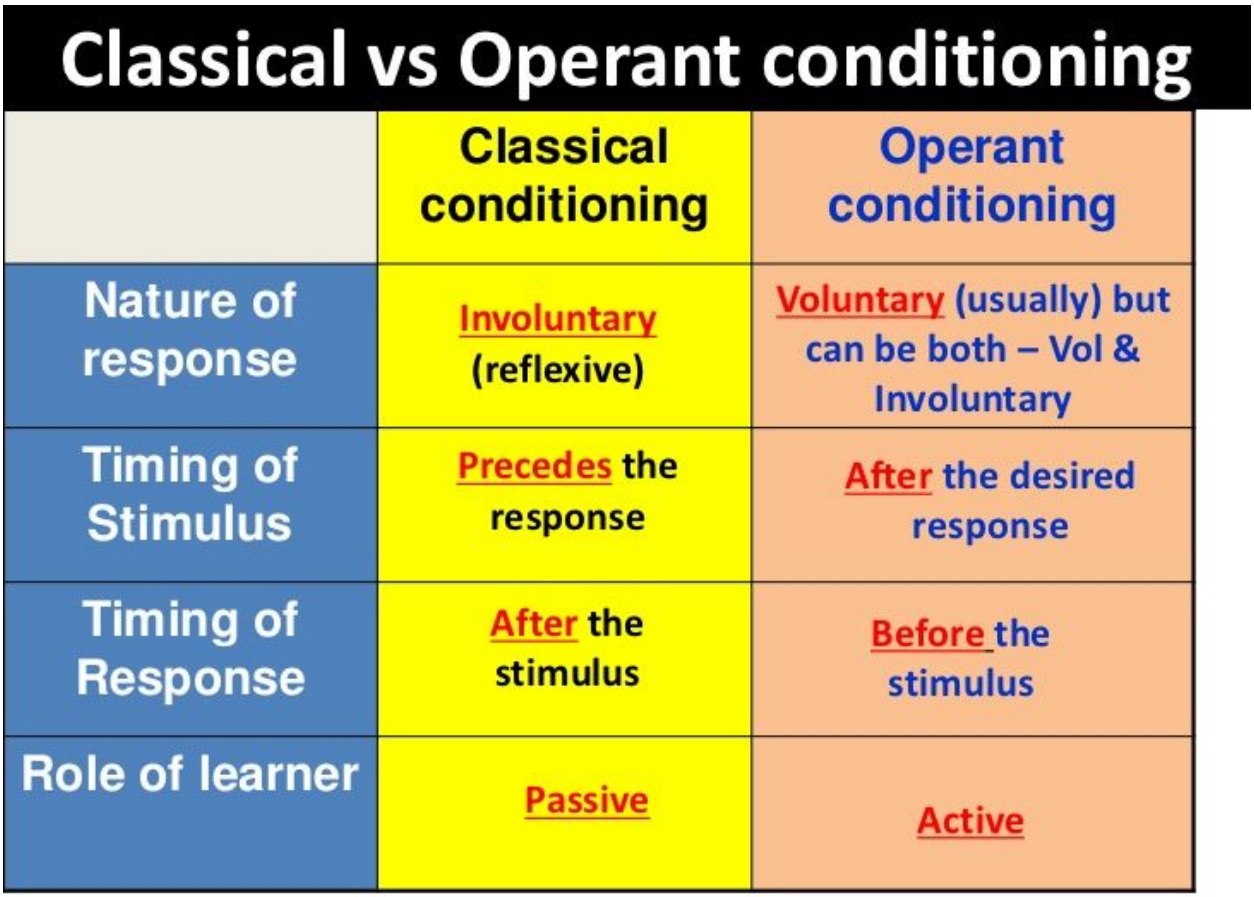

Contiguity Theory and One Trial Learning

General

Contiguity theory or *law of contiguity* and *one trial learning* are ideas introduced in 1920s by American philosopher, mathematician and psychologist Edwin Guthrie in collaboration with Stevenson Smith. Law of contiguity states that a **close temporal relationship** between a stimulus and a response is the only necessary condition for an association between the two to be established.

What is contiguity theory and one trial learning?

Guthrie attempted to explain learning through **association** of stimuli with responses.[1] Learning, in terms of behavior is a function of the environment. According to Guthrie, learning is associating a particular stimulus with a particular response. This association, however, will only occur if **stimuli and responses occur soon enough** one after another (***the contiguity law***). The association is established on the **first experienced instance of the stimulus** (***one trial learning***). Repetitions or **reinforcements** in terms of reward or punishment do not influence the strength of this connection. Still, every stimulus is a bit different, which results in many trials in order to form a general response.

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This was according to Guthrie the only type of learning identifying him not as *reinforcement theorist*, but *contiguity theorist*.

More complex behaviors are composed of a **series of movements** (*habits*)[2], where each movement is a small stimulus-response combination. This movements or are actually what is being learned in each one trial learning rather than behaviors. Learning a number of moves forms an act (incremental learning). Unsuccessful acts remain not learned because they are replaced by later successfully learned acts.[3] Other researchers like John Watson studied whole acts just because it was easier, but movements are, according to Guthrie what should actually be studied.

Forgetting occurs not due to time passage, but due to interference. As time passes, stimulus can become associated with new responses. Three different methods can help in forgetting an undesirable old habit and help replacing it[4]:

- **Fatigue method** - using numerous repetitions, an animal becomes so fatigued that it is unable to reproduce the old response, and introduces a new response (or simply doesn't react).
- **Threshold method** - first, a very mild version of the stimulus below the threshold level is introduced. Its intensity is then slowly increased until the full stimulus can be tolerated without causing the undesirable response
- **Incompatible stimuli method** - the response is “unlearned” by placing the animal in a situation where it cannot exhibit the undesirable response.

Although it was intended to be a general theory of learning, Guthrie's theory was tested mostly on animals.

Reinforcement

Reinforcement is a process to develop or strengthen pleasing behaviour. Reinforcement hypothesis is the method of shaping behaviour by controlling the consequences of the behaviour. In reinforcement theory a combination of rewards and/or punishments is used to strengthen desired behaviour or put out unwanted behaviour. Any behaviour that elicits a consequence is called operant behaviour, because the individual operates on his or her environment. Reinforcement theory focuses on the relationship between the operant behaviour and the related consequences, and is also called as operant conditioning. Major contributor of this theory was B.F. Skinner who developed modern ideas about reinforcement theory. Skinner argued that the internal needs and drives of individuals can be ignored because people learn to exhibit certain behaviors based on what happens to them as a result of their behaviour. Management team must always try to shape employee behaviours to get better contributions to the company. This can involve supporting positive behaviours or reducing negative behaviours.

There are many types of reinforcement: positive and negative.

Positive reinforcement strengthens and enhances behaviour by the presentation of positive reinforcers. There are primary reinforcers and secondary reinforcers. Primary reinforcers satisfy basic biological needs and include food and water. However, primary reinforcers do not always reinforce. For instance, food may not be a reinforcer to someone who has just completed a five course meal. Most behaviours in organizations are influenced by secondary reinforcers. These include benefits in organizational set up. Positive reinforcement defines and communicates expected behaviours and strengthens the connection between high performance and rewards. It

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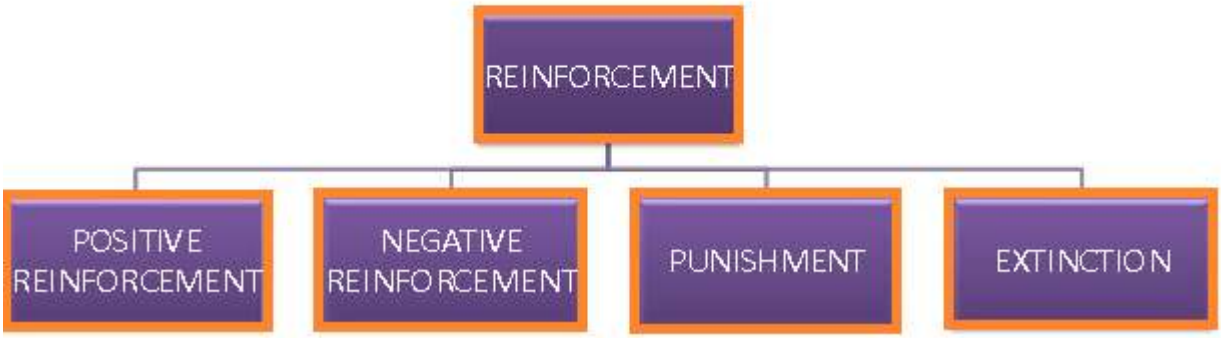
reinforces an employee's behaviour immediately after learning a new technique and promotes quick, thorough learning. It motivates effective workers to continue to do good work. Lack of reinforcement leads to job dissatisfaction. It increases productivity by rewarding workers who conserve time and materials. Employees who are rewarded after they successfully perform feel self-confident and become eager to learn new techniques, take advanced training, and accept more responsibility.

Rewarding employees who suggest improved work procedures will produce more innovation, it creates a relaxed work environment, reward new ideas and tolerate innovative failures.

In negative reinforcement, a disagreeable event that precedes a behaviour is removed when the desired behaviour occurs. This process increases the likelihood that the desired behaviour will occur. Just as there are positive reinforcers, there are the stimuli that strengthen responses that permit an organism to avoid or escape from their presence. Some negative reinforcers such as intense heat, extreme cold, or electric shock, exert their effects the first time they are encountered, whereas others acquire their impact through repeated association.

Punishment: Punishment is an undesirable outcome a worker receives for bad behaviour. This can involve actions such as demoting the employee or suspending the employee. A manager may put an employee on trial pending a change in behaviour. Additionally, the employee may lose overtime privileges or consideration for raises.

Extinction: Extinction is the elimination of a behaviour. This type of behaviour modification should be reserved for the most damaging behaviours. When individual want an immediate and complete stop to unwanted actions, such as smoking on the job or using sexual innuendo, offer the most severe punishment, such as firing, if person see any more of the behaviour. Managers should make the consequences clear and make sure employees know there will be zero tolerance.



Schedules of reinforcement: Reinforcement schedule is the timing of the behavioural consequences that follow a given behaviour. Fundamentally, there are two types of reinforcement schedules that include continuous and intermittent. If a behaviour is reinforced each time it occurs, it is called continuous reinforcement. Theoretical studies have demonstrated that continuous reinforcement is the best way to establish new behaviours or to eliminate undesired behaviours. However, this type of reinforcement is generally not practical in an organizational setting. Therefore, intermittent schedules are usually employed. Intermittent reinforcement means that each instance of a desired behaviour is not reinforced. There are at least four types of

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intermittent reinforcement schedules: fixed interval, fixed ratio, variable interval, and variable ratio. Fixed interval schedules of reinforcement take place when desired behaviours are reinforced after set periods of time. In organization, a fixed interval schedule is a weekly paycheque. A fixed interval schedule of reinforcement does not appear to be a particularly strong way to elicit desired behaviour, and behaviour learned in this way may be subject to rapid extinction. The fixed ratio schedule of reinforcement applies the reinforcer after a set number of occurrences of the desired behaviours. An organizational example of this schedule is a sales commission based on number of units sold. Like the fixed interval schedule, the fixed ratio schedule may not produce consistent, long-lasting, behavioural change. Variable interval reinforcement schedules are used when desired behaviours are reinforced after varying periods of time. For example, there would be special recognition for successful performance and promotions to higher-level positions. This reinforcement schedule appears to elicit desired behavioural change that is resistant to extinction. Lastly, the variable ratio reinforcement schedule applies the reinforcer after a number of desired behaviours have occurred, with the number changing from situation to situation. In organization, variable ratio schedules are bonuses or special awards that are applied after varying numbers of desired behaviours occur. Variable ratio schedules appear to produce desired behavioural change that is reliable and very resistant to extinction.

Major function of the laws of reinforcement theory to organizational set up is behavioural modification, or behavioural contingency management. Characteristically, a behavioural modification program comprises of four steps:

I. Specifying the desired behaviour as objectively as possible.
II. Measuring the current incidence of desired behaviour.
III. Providing behavioural consequences that reinforce desired behaviour.
IV. Determining the effectiveness of the program by systematically assessing behavioural change.

Organization's management style can integrate each style of reinforcement. However, contemporary organization theories generally advocate a focus on positive reinforcement, which encourages employee development and empowerment by nurturing pioneering and proactive behaviour. On the contrary, management styles that focus on negative reinforcement tend to be controlling because supervisors must confirm compliance before removing negative stimuli, which requires heavy control and observation.

Reinforcement theory is significant in changing the behaviour of employees in organizational environment as it explains how people learn behaviour. It is regularly applied to organizational settings in the situation of a behavioural modification program. The theory of reinforcement theory is disapproved for its principles that offer important insight into individual learning and motivation. It can be concluded that workers should be encouraged when they have a chance to perform a challenging task in the dissimilar situation in which performance depends on the skills and feedback is given regarding the performance. Reinforcement theory assists how individual or employee progress their learning skills and improve their self-confidence to attain their goals and contribute in the organization's growth.

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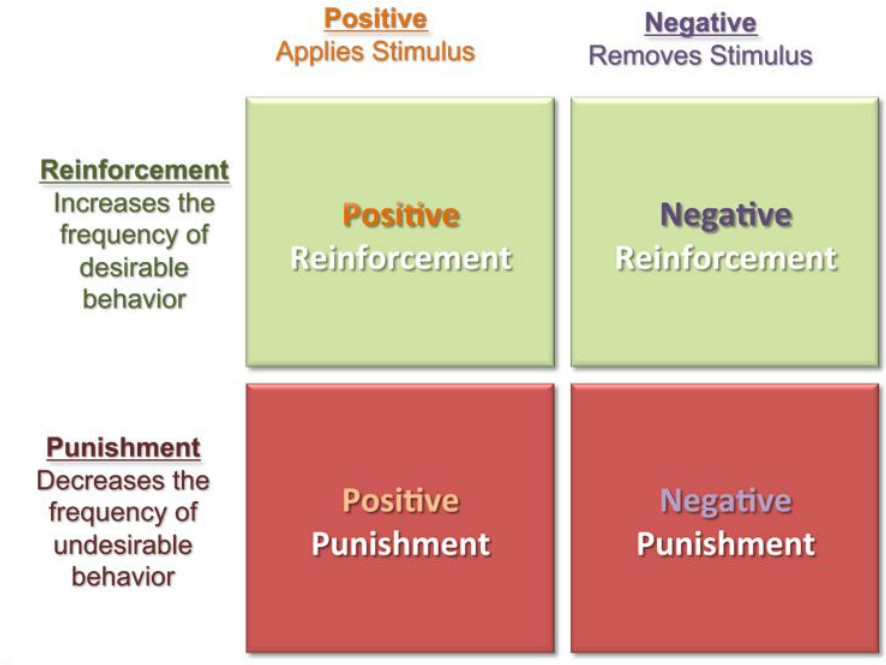
Reinforcement Theory

Reinforcement is anything that both increases the strength of response and tends to induce repetitions of the behavior. Four types of reinforcement strategies can be employed by managers to influence the behavior of the employees, viz., positive reinforcement, negative reinforcement, extinction and punishment.



- **Positive Reinforcement** : Positive reinforcement strengthens and increases behavior by the presentation of a desirable consequence (reward). In other words, a positive reinforce is a reward that follows behavior and is capable of increasing the frequency of that behavior. There are two typos of positive: reinforces: primary and secondary. Primary reinforcers such as food, water and sex are of biological importance and have effects, which arc independent of past experiences. For instance, a primary reinforcer like food satisfies hunger need and reinforced food-producing behavior. Secondary reinforcers like job advancement, recognition, praise and esteem result from previous association with a primary reinforcer. Primary reinforcers must be learned. In order to apply reinforcement procedures successfully, management must select reinforcers that are sufficiently powerful and durable.
- **Negative Reinforcement** : The threat of punishment is known as negative reinforcement. Negative reinforcers also serve to strengthen desired behavior responses leading to their removal or termination.
- **Extinction** : Extinction is an effective method of controlling undesirable behavior. It refers to non-reinforcement. It is based on the principle that if a response is not reinforced, it will eventually disappear. Extinction is a behavioral strategy that does not promote desirable behaviors but can help to reduce undesirable behaviors.
- **Punishment** : Punishment is a control device employed in organizations to discourage and reduce annoying behaviors of employees.

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UNIT 4: REMEMBERING & FORGETTING:

The Decay Theory of Forgetting

Decay theory
suggest that we forget something because the memory of it fades with time. This theory would suggest that if we do not attempt to recall an event, the greater the time since the event the more likely we would be to forget the event. Thus, this theory suggests that memories are *not* permanent.

This simply states that if a person does not access and use the memory representation they have formed, the memory trace will fade or decay over time.

Decay Theory suggests that memories fade and disappear over the natural passage of time, especially if they are not accessed frequently. Although there are other factors that are suspected to cause memory disappearance, decay theory encompasses the broad loss and decay of memories over time. It affects mostly short term memories and if a memory isn't recalled frequently it is more likely to be lost or lessened in strength.

Trace Decay Theory

The trace decay theory of forgetting states that all memories fade automatically as a function of time. Under this theory, you need to follow a certain pathway, or trace, to recall a memory. If this pathway goes unused for some amount of time, the memory decays, which leads to difficulty recalling, or the inability to recall, the memory. Rehearsal, or mentally going over a memory, can slow this process. But disuse of a trace will lead to memory decay, which will ultimately cause retrieval failure. This process begins almost immediately if the information is not used: for example, sometimes we forget a person’s name even though we have just met them.

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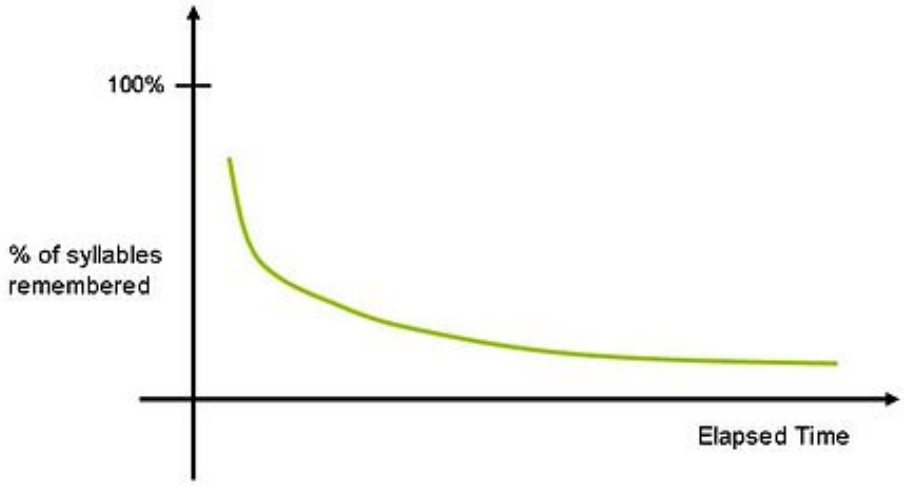

Memory over time: Over time, a memory becomes harder to remember. A memory is most easily recalled when it is brand new, and without rehearsal, begins to be forgotten.

Decay theory
an organic/physical explanation of forgetting based on the assumption that when something new is learned, a memory trace or neural imprint of the experience (that contains the stored information) is formed in the brain; the trace gradually fades over time through disuse unless it is reactivated by being used.
Interference theory
an explanation that proposes that forgetting in long-term memory occurs because other memories interfere with retrieval of what you are trying to recall, particularly if the other memories are similar to the one you are trying to remember.
Motivated forgetting
when forgetting in long-term memory arises from a strong motive or desire to forget, usually because the experience is too disturbing or upsetting to remember
Retrieval
the process of locating and recovering stored information from memory so that we are consciously aware of it.
Retrieval failure theory
an explanation of forgetting due to lack of or failure to use the right cue to retrieve information stored in memory; the information is not lost forever but it simply cannot be retrieved at that moment
Retroactive interference
when new information interferes with the ability to remember old information
Suppression
a type of motivated forgetting in which an individual actively keep a memory out of conscious awareness by choosing not to attend to or think about it
Tip-of -the-tongue phenomenon (TOT)

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the feeling of being aware of knowing something and being confident that it will be remembered, but unable to be retrieve the information at that point in time.
Demonstrates retrieval failure theory
Proactive interference
when information learned previously interferes with the ability to remember new information.
Repression
an unconscious process (defence mechanism) through which an individual blocks a memory of an event or experience from entering conscious awareness because of the anxiety associated with recall; said to be a type of motivated forgetting

Interference Theory

If you had asked psychologists during the 1930s, 1940s, or 1950s what caused forgetting you would probably have received the answer "**Interference**".

It was assumed that memory can be disrupted or interfered with by what we have previously learned or by what we will learn in the future. This idea suggests that information in long term memory may become confused or combined with other information during encoding thus distorting or disrupting memories.

Interference theory states that forgetting occurs because memories interfere with and disrupt one another, in other words forgetting occurs because of interference from other memories (Baddeley, 1999). There are two ways in which interference can cause forgetting:

1. **Proactive interference** (pro=forward) occurs when you cannot learn a new task because of an old task that had been learnt. When what we already know interferes with what we are currently learning – where old memories disrupt new memories.

2. **Retroactive interference** (retro=backward) occurs when you forget a previously learnt task due to the learning of a new task. In other words, later learning interferes with earlier learning - where new memories disrupt old memories.

Proactive and retroactive Interference is thought to be more likely to occur where the memories are similar, for example: confusing old and new telephone numbers. Chandler (1989) stated that students who study similar subjects at the same time often experience interference.

Previous learning can sometimes interfere with new learning (e.g. difficulties we have with foreign currency when travelling abroad). Also new learning can

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sometimes cause confusion with previous learning. (Starting French may affect our memory of previously learned Spanish vocabulary).

In the short term memory interference can occur in the form of distractions so that we don't get the chance to process the information properly in the first place. (e.g. someone using a loud drill just outside the door of the classroom.)

2. Interference:

An important cause of forgetting in everyday life is interference of learnt material. There are two kinds of interference:

a. Proactive inhibition:

If the earlier learning interferes with later learning and inhibits recall of new material, it is known as proactive inhibition. This usually happens when the previous learning is better than the present one. For example, we meet somebody in a party yesterday, today while remembering those names we recall the names of people we met last week.

b. Retroactive inhibition:

Inhibition of the earlier learning and recall by later learning is known as retroactive inhibition. The interpolated activity between original learning and its recall causes forgetting. It is called retroactive because the interference is with the memory of events that came before the interfering activity. For example, a student learnt about motivation in psychology last week, this week he learns about perception.

Now he tries to recall information about motivation but the points pertaining to perception will come to his memory.

Motivated forgetting theory

Motivated theories of forgetting suggest that we have a tendency to forget things that aretoo painful to think about. Sigmund Freud used the term repression to explain thiscommon memory phenomenon. Repression refers to keeping distressing thoughts andfeelings buried in one's unconscious. However, other researchers argue that repressionmay not exist. Instead, we might reconstruct or revise painful memories so they are lessdistressing.

This is a kind of forgetting in which the individual intentionally forgets. However, the information stored can be retrieved and brought

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back to memory, but the individual does not want those memories. So he will repress them. It may be observed that generally people remember pleasant experiences than unpleasant ones.

Theories of forgetting

Theories of forgetting

According to Munn (1967) “Forgetting is the loss, temporary or Permanent, of the ability to recall or recognize something learnt Earlier.

“According to Drever (1952) “Forgetting means failure at any time. To recall an experience, when attempting to do so, or to perform an Action previously learnt .

Schacter’s “Seven Sins of Memory”

- Memories are transient (fade with time)
- We do not remember what we do not pay attention to
- Our memories can be temporarily blocked
- We can misattribute the source of memory
- We are suggestible in our memories
- We can show memory distortion (bias)
- We often fail to forget the things we would like not to recall (persistence of memory)

Decay theories

- Memories fade away or decay gradually if unused
- Time plays critical role
- Ability to retrieve info declines with time after original encoding

Decay Theory = gradual fading of the physical memory trace (when new memory forms, there is a change in brain structure or chemistry. If unused, normal brain metabolic processes erode memory trace.

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The term decay theory was first coined by Edward Thorndike in his book “The Psychology of Learning” in 1914. This simply states that if a person does not access and use the memory representation they have formed the memory trace will fade or decay over time. This theory was based on the early memory work by Hermann Ebbinghaus in the late 19th century. The decay theory proposed by Thorndike was heavily criticized by McGeoch and his interference theory.

Trace Decay Theory of Forgetting

This explanation of forgetting in short term memory assumes that memories leave a trace in the brain. A trace is some form of physical and/or chemical change in the nervous system. Trace decay theory states that forgetting occurs as a result of the automatic decay or fading of the memory trace. Trace decay theory focuses on time and the limited duration of short term memory. This theory suggests short term memory can only hold information for between 15 and 30 seconds unless it is rehearsed. After this time the information / trace decays and fades away.

Decay theory proposes that memory fades due to the mere passage of time. Information is therefore less available for later retrieval as time passes and memory, as well as memory strength, wears away. When we learn something new, a neurochemical “memory trace” is

created. However, over time this trace slowly disintegrates. Actively rehearsing information is believed to be a major factor counteracting this temporal decline.

It is widely believed that neurons die off gradually as we age, yet some older memories can be stronger than most recent memories. Thus, decay theory mostly affects the short-term memory system, meaning that older memories (in long-term memory) are often more resistant to shocks or physical attacks on the brain. It is also thought that the passage of time alone cannot cause forgetting, and that Decay Theory must also take into account some processes that occur as more time passes.

Trace decay refers to apparent loss of information already encoded and stored in an individual's long term memory. It is often a gradual process in which old memories are unable to be recalled from memory storage.

Decay theory

Decay is the simplest explanation of forgetting. Decay is what supposedly occur when the passage of time causes us to forget. The memory trace (or engram) fades and the memory is no longer available. This theory is popular because it appears to fit with common-sense views of the way memory works. One of the most influential attempts to explain forgetting in terms of decay was by Hebb (1949).

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However, it is very difficult to prove experimentally that decay actually occurs. For example, Peterson & Peterson's results can be explained in terms of decay of the memory trace over the retention interval, but they can also be explained by interference by the distracter task (counting backwards in threes).

However, one observation to support decay is that STM can hold fewer words when the words are long (harpoon or cyclone) than if words are short (bishop & pewter). Note that we are referring here to how long the word takes to say (try it). According to Baddeley et al (1975) this effect occurs because as the words are presented, they are encoded acoustically. This takes longer for the long sounding words resulting in an increased possibility that the trace will have decayed for some of the words.

Ebbinghaus also employed a **savings method** to test his memory retention. He first counted the number of times needed to rehearse a list of nonsense syllables in order to commit it to memory. Then he counted the number of times it took to relearn the list after a period of time had elapsed. If it look ten repetitions to learn the list the first time and five the second, the savings would be 50 percent.

Memory researchers recognize that when people attempt to memorize information, they generally retain more information when they space their study sessions than when they cram them together within a single day (Cepeda et al., 2006). One reason for this effect, called the **massed vs. spaced practice effect**, is that massed, or crammed, practice causes mental fatigue that interferes with learning and retention. A practical implication of this effect should be obvious: When studying for exams, don't cram. Rather, space out your study sessions. You'll learn more and remember more of what you learn. Also, spaced practice produces the same learning benefits for other animals, which is useful to keep in mind when trying to train your dog (Aamodt & Wang, 2008).

Decay theory helps account for memory kiss due to the passage of time. However, a major weakness of the theory is that it fails to account for the unevenness with which memory decays over time. Some memories remain well preserved over time, whereas others quickly fade. One reason for this unevenness is that more distinctive or unusual information tends to be remembered better over time. You're likely to remember your first date belter than your 14th. You're also more likely to later recall the name of a man you were introduced to at a party if the man's name was Oscar than if it had been Bob or John.

Ebbinghaus studied retention of meaningless syllables. When we examine recall of more meaningful information, such as poetry or prose, we find a more gradual loss of memory over time. Then again, little if any forgetting may occur for important life events and knowledge we acquire about our work or career. Another factor that helps explain forgetting interference (Wixted, 2005).

Interference Theory: When Learning More Leads to Remembering Less

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Chances are you have forgotten what you ate for dinner a week ago Wednesday. The reason for your forget fullness, according to interference theory, is interference from memories of dinners that preceded and followed that particular dinner. On the other hand, you are unlikely to forget your wedding day because it is so unlike any other day in your life (except for those, perhaps, who have taken many walks down the aisle). Interference theory helps explain why some events may be easily forgotten while others remain vivid for a lifetime. The greater the similarity between events, the greater the risk of interference. There are two general kinds of interference, *retroactive interference* and*proactive interference.*

Interference occurring after material is learned but before it is recalled is called retroactive interference. Perhaps you have found that material you learned in your9:0Q a.m. class, which seemed so clear when you left the classroom, quickly began to fade once you started soaking in information in the next class. In effect, new memories retroactively interfere with unstable earlier memories that are still undergoing the process of memory consolidation (Wixied, 2004).

■ ***Sleep on* it**. Want to improve your recall of newly learned material? Sleep on it. Investigators believe that sleep enhances learning and memory by helping to convert fragile new memories into lasting ones. Learning material and then sleeping on it may help you retain more of what you learn.

■ ***Rehearse fresh memories.*** New long-term memories are fragile. Practicing or rehearsing fresh memories aloud or silently can strengthen them, making them more resistant lo the effects of interference. Repeated practice beyond the point necessary to reproduce material without error is called **overlearning**. Apply the principle of overlearning to reviewing the material in this text, such as by rehearsing your knowledge of the key concepts in each chapter two or more limes after you can demonstrate your knowledge without any errors.

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■ *Give yourself a break.* Try not to schedule one class directly after another. Give your recent memories time lo consolidate in your brain.

■ *Avoid sequential study of similar material.* Try not to study material that is similar in content In back-to-back fashion—for example, avoid scheduling a French class right after a Spanish one.

Interference may help explain the **serial position effect**, the tendency lo recall the first and last items in a list, such as a shopping list, better than those in the middle of the list. The unfortunate items in the middle are often forgotten. In a study in which people were asked to name the last seven U-S. presidents in order, they were more likely lo make mistakes in the middle of the list than al either the beginning or the end. Serial position effects influence both short-term and long-term memory.

Interference is the likely culprit in serial position effects. Items compete with one another In memory, and interference is greatest in the middle of a list than at either end of the list. For example, in ***i*** list of seven items, the fourth item may interfere with the item that it follows and the item that it precedes. But interference is least for the first and last items in the list—the first, because no other item precedes it; the last, because no other item follows it. The tendency to recall items better when they arc learned first is called the **primacy effect**. The tendency to recall items better when they are learned last is called the **recency effect**. As the delay between a study period and a test period increases, primacy effects become stronger whereas recency effects become weaker. This **recency-primacy shift** means that as time passes after you have committed a list to memory, it becomes easier to remember the early items but more difficult lo remember the later-appearing items in the list.

In sum, evidence shows that both the passage of time and interference contribute to forgetting. But neither decay theory nor interference theory can determine whether forgotten material becomes lost to memory or just more difficult to retrieve. Some forgotten material can be recovered if subjects are given retrieval cues to jog their memories, such as exposure to stimuli associated with the original situations in which the memories were formed. This brings us to a third model of forgetting, retrieval theory.

Tulving's cue dependent theory of forgetting state dependent memory and forgetting

The cue-dependent theory of forgetting (Tulving, 1975)

This theory of forgetting applies to long-term memory, not the short-term store. It states that forgetting occurs when the right cues are not available for memory retrieval. Tulving put forward this theory in 1975, stating that memory is dependent on the right cues being available, and forgetting occurs when they are absent.

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Tulving's theory states that there are two events necessary for recall:

o **a memory trace** (information is laid down and retained in a store as a result of the original perception of an event)

o **a retrieval cue** (information present in the individual's cognitive environment at the time of retrieval that matches the environment at the time of recall)

For Tulving, forgetting is about the memory trace being intact, but memory failing because the cognitive environment has changed. There is no appropriate cue to activate the trace. The most noticeable experience of this cue-dependent forgetting is the **Tip of the Tongue Phenomenon** (Brown and McNeill, 1966). This refers to knowing a memory exists but being temporarily unable to recall it.

Cues have been differentiated into:

- **context-dependent cues** – the situation or context
- **state-dependent cues –** the person's state or mood

Below are some brief outlines of studies which support the cue-dependency theory…

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State (internal) Dependent Cues

The basic idea behind state-dependent retrieval is that memory will be best when a person's physical or psychological state is similar at encoding and retrieval. For example, if someone tells you a joke on Saturday night after a few drinks, you'll be more likely to remember it when you're in a similar state - at a later date after a few more drinks. Stone cold sober on Monday morning, you'll be more likely to forget the joke.

State Retrieval clues may be based on state-the physical or psychological state of the person when information is encoded and retrieved. For example, a person may be alert, tired, happy, sad, drunk or sober when the information was encoded. They will be more likely to retrieve the information when they are in a similar state.

Tulving and Pearlstone's (1966) study involved **external cues** (e.g. presenting category names). However, cue-dependent forgetting has also been shown with **internal cues** (e.g. mood state). Information about current mood state is often stored in the memory trace, and there is more forgetting if the mood state at the time of retrieval is different. The notion that there should be less forgetting when the mood state at learning and at retrieval is the same is generally known as **mood-state-dependent memory**.

A study by **Goodwin et al. (1969)** investigated the effect of alcohol on state-dependent retrieval. They found that when people encoded information when drunk, they were more likely to recall it in the same state. For example, when they hid money and alcohol when drunk, they were unlikely to find them when sober. However, when they were drunk again, they often discovered the hiding place. Other studies found similar state-dependent effects when participants were given drugs such as marijuana.

People tend to remember material better when there is a match between their mood at learning and at retrieval. The effects are stronger when the participants are in a positive mood than a negative mood. They are also greater when people try to remember events having personal relevance.

Retrieval inhibition as a theory of forgetting.

Retrieval inhibition refers to when some sort of cognitive event or environmental distractor reduces the probability of performance of a learning event. It may cause encoding inhibition.

Retrieval-induced forgetting (or RIF) is a memory phenomenon where remembering causes forgetting of other information in memory.

Mechanisms Underlying List-Method Directed Forgetting

Retrieval Inhibition Hypothesis

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- Forget instructions inhibit List One items
- Reduces the activation of unwanted memories
- However, they remain available
- Re-presenting forgotten items restores their activation levels
- Explains why items can be recognized but not recalled

Context Shift Hypothesis

- Forget instructions mentally separate List One from List Two items
- The mental context (frame of mind) shifts between the lists
- List Two context lingers into the final test
- The new context is a poor retrieval cue for List One items
- May involve *inhibition* of the unwanted context

Intentional Retrieval Suppression

- Anderson et al. (2004)
- Suppressing retrieval is related to:
- Increased activity in control regions:
- The left and right lateral prefrontal cortex and the anterior cingulate cortex
- These regions are also involved in motor inhibition
- Decreased activity in the episodic memory area:
- The hippocampus
- Suggests that people can intentionally regulate hippocampal activity to disengage recollection
- Others have also found significant suppression for:
- Negative memories
  (Depue et al., 2006; 2007)
- Faces paired with unpleasant scenes

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- Replicated previous neuroimaging results of Anderson et al. (2004)
- Positive memories
  (Joormann et al., 2005)

Motivated Forgetting encompasses 3 kinds of forgetting:

- **Intentional Forgetting**:
- Forgetting arising from processes initiated by a conscious goal to forget.
- Conscious suppression
- Intentional contextual shifts (avoidance of retrieval cues)
- **Psychogenic Amnesia**:
- Profound forgetting that is psychological in origin affecting major periods of one's life or otherwise significant events.
- **Other Forgetting**: not accidental but also not consciously intended, such as simply attempting to think about something else when confronted with an unpleasant reminder, without necessarily trying to forget it.

Trace-dependent forgetting

According to the theory of trace-dependent forgetting, the memory trace fades with time and, once forgetting has occurred, material has been lost from the memory system. If this theory is correct then eyewitnesses should be interviewed as soon as possible after the crime. This theory does have some experimental support (Jenkins and Dallcnbach 1924), but research has also shown that it is not so much time, as what we do in this time, that is the crucial factor (Davies 1999).

According to Endel Tulving (1974), trace-dependent forgetting and cue-dependent forgetting are the only two major causes of forgetting. "Trace-dependent forgetting" occurs because the memory trace has deteriorated or decayed or required information or material has been lost from the memory system. Physiological traces in the brain are not available at the time of recall or retrieval.

"Cue-dependent forgetting" occurs when the memory trace still exists, but there is no suitable retrieval cue to trigger off the memory. The information is not accessible. It is a kind of forgetting in which the required information or material is in the long-term memory store, but cannot be retrieved without a suitable retrieval cue. The cues present at the time of learning are not present at the time of recall or interfering and competing cues are present and they block the memory. Cue-dependent or retrieval failure is the failure to recall a memory due to missing

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stimuli or cues that were present at the time the memory was encoded. It is one of the five cognitive psychology theories of forgetting. It states that memory is sometimes temporarily forgotten purely because it cannot be retrieved, but the proper cue can bring it to mind. The information still exists, but without these cues, retrieval is unlikely. Furthermore, a good retrieval cue must be consistent with the original encoding of the information. If the sound of the word is emphasized during the encoding process, the cue should also put emphasis on the phonetic quality of the word. Information is available, however, just not readily available without these cues.

Motivated forgetting theory

Motivated forgetting can be defined as the failure to retrieve unpleasant or threatening memories. Motivated forgetting can be either conscious, where you simply decide to think about other things, or unconscious. Conscious motivated forgetting has been referred to as suppression, while unconscious motivated forgetting has been referred to as repression.

The Motivated Forgetting theory suggests people forget because they push unpleasant thoughts and feelings deep into their unconscious. People may actively work to forget memories, especially those of traumatic or disturbing events or experiences.

The two basic forms of motivated forgetting are:

Suppression:	a conscious form of forgetting
Repression:	an unconscious form of forgetting

Physical Injury or Trauma

Anterograde amnesia is the inability to remember events that occur after an injury or traumatic event. Retrograde amnesia is the inability to remember events that occurred before an injury or traumatic event.

Organic Causes

Forgetting that occurs through physiological damage to the brain is referred to as organic causes of forgetting. These theories encompass the loss of information already retained in long term memory or the inability to encode new information. This is typically caused by the gradual slowing down of the central nervous system due to aging. Examples include Alzheimer's, Amnesia, and Dementia.

Interference is an **explanation for forgetting** in **long term memory.**

The basic theory states that interference occurs when information that is similar in format gets in the way of the information that someone is trying to recall.

There are two types of interference; **retroactive** and **proactive**.

Retroactive interference is when more recent information gets in the way of trying to recall older information. An example would be calling your ex-boyfriend/girlfriend by your

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new boyfriend/girlfriend's name. The new name retroactively interferes with the old one, which is clearly problematic for recall.

Proactive interference is the reverse direction of interference to retroactive interference. This is when old information prevents the recall of newer information. This could, for example, occur with telephone numbers. When trying to recall a new phone number, the old phone number you have previously had for years could proactively interfere with the recall, to the point when it is very difficult to remember the new number.

Proactive and Retroactive Interference

Interference theory refers to the occurrence of interaction between new learned material and past behavior, memories or thoughts that cause disturbance in retrieval of the memory. Based on the disturbance caused in attempts to retrieve past or latest memories, interference have been classified into two different kinds.

- **Proactive Interference**
- **Retroactive Interference**

Differences between Proactive and Retroactive Interference

Differences between Proactive and Retroactive

Interference

Proactive Interference	**Retroactive Interference**
The form of interference where old memories restrain the capacity	The form of interference where new memories restrain the capacity

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Differences between Proactive and Retroactive Interference

Proactive Interference	**Retroactive Interference**
to remember new information is called Proactive Interference.	to old information is called Retroactive Interference.
Proactive interference occurs when past memories hold back an individual from retaining new memories.	Retroactive interference occurs when new memories hold back an individual from retaining old memories.

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Differences between Proactive and Retroactive Interference

Proactive Interference	**Retroactive Interference**
Competition is what prevents recall of the memory in proactive interference.	Along with competition, there is also unlearning in retroactive interference.
It has been hypothesized that, "*Forgetting working memories would be non-existent if not for proactive interference."*	Retroactive interference has helped to attain a decisive conclusion to a long going debate that, "*Forgetting is not simply a failure or weakness of the memory system, but rather an integral part of our stored knowledge*

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Differences between Proactive and Retroactive Interference

Proactive Interference	**Retroactive Interference**
	repertoire."
Rest time doesn't seem to play any factor in affecting the occurrence of proactive interference.	In various experiments, it has been seen that participants do not seem to experience much retroactive interference when made to recall the first world list after a certain amount of rest time.
Example 1:	**Example 1:** You have been

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Differences between Proactive and Retroactive Interference

Proactive Interference	**Retroactive Interference**
You took Spanish classes a while ago. And now, while trying to learn French, you tend to use Spanish vocabulary in the French class, thus hindering your ability to learn French.	taking French lessons recently. You try to speak in Spanish, which you learned previously, but you are unable to do so because French words keeps jumping in front of you and your memory is all jumbled up.
Example 2: You learn a variety of dance moves. You keep	**Example 2:** You learn a variety of dance moves. You are only able to

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Differences between Proactive and Retroactive

Interference

Proactive Interference	**Retroactive Interference**
trying to do previously learned dance moves while trying to repeat the latest dance move you learned.	remember the latest move.

UNIT 5: Emotion:

Schachter-Singer’s Two-Factor Theory

This theory focuses on the role of physiological arousal as a primary factor in emotions. However, it also suggests that physical arousals alone cannot be responsible for all the emotional responses. Therefore, it takes into account the cognitive aspect of the emotional reaction.

or example, you are sitting in a dark room all by yourself and all of a sudden you hear breathing sound behind you. Your heart rate increases and you begin to tremble. You notice the increased heart rate and realize that it is caused by fear. Therefore, you feel frightened.

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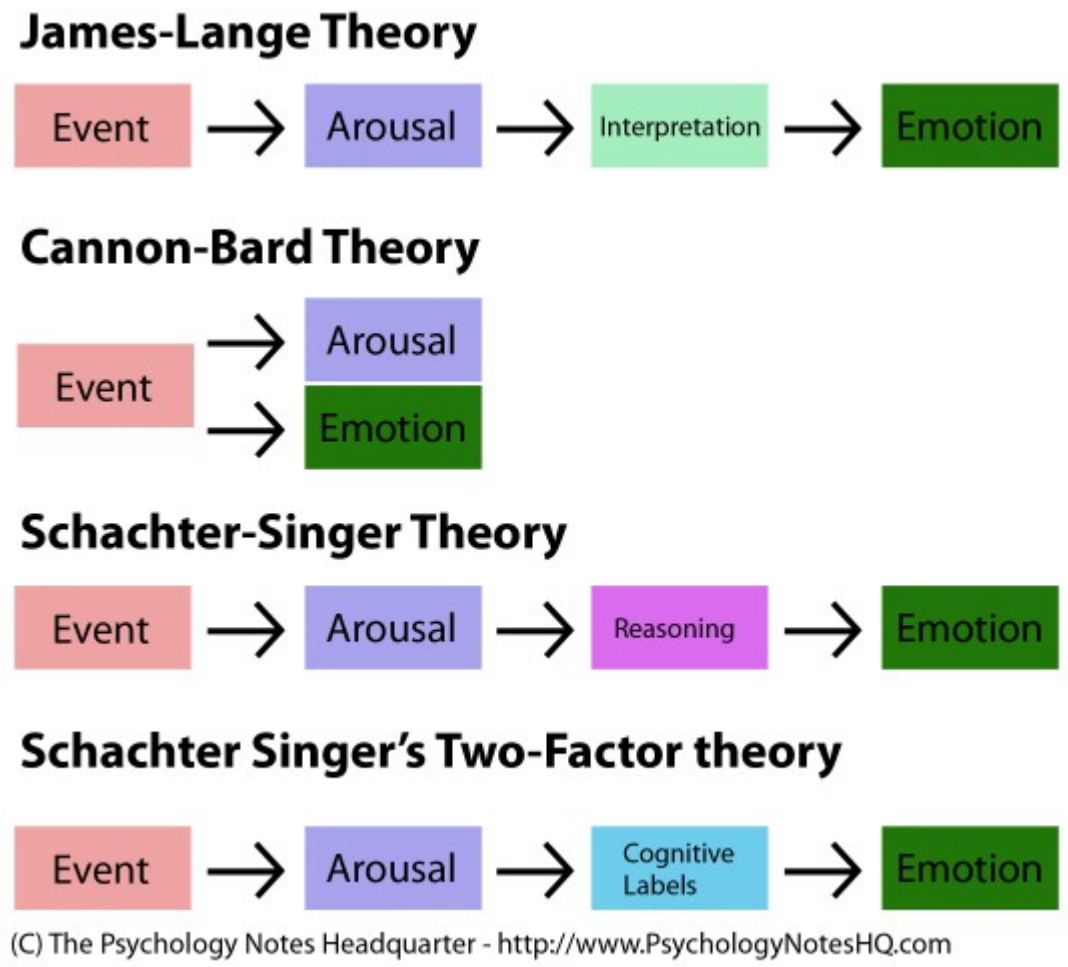
The whole process begins with an external stimulus (breathing sound in a dark room), followed by the physiological arousal (increased heart rate and trembling). The cognitive labels come into action when we associate the physiological arousals to fear, which is immediately followed by the conscious experience of the emotion of fear.



What Is the Two-Factor Theory?

Like the James-Lange theory of emotion, and in contrast to the Cannon-Bard theory of emotion, Schachter and Singer felt that physical arousal played a primary in emotions. However, they suggested that this arousal was the same for a wide variety of emotions, so physical arousal alone could not be responsible for emotional responses.

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The two-factor theory of emotion focuses on the interaction between physical arousal and how we cognitively label that arousal. In other words, simply feeling arousal is not enough; we also must identify the arousal in order to feel the emotion.

So, imagine you are alone in a dark parking lot walking toward your car. A strange man suddenly emerges from a nearby row of trees and rapidly approaches. The sequence that follows, according to the two-factor theory, would be much like this:

7. I see a strange man walking toward me.
   2. My heart is racing and I am trembling.
   3. My rapid heart rate and trembling are caused by fear.
   4. I am frightened!

   The process begins with the stimulus (the strange man), which is followed by the physical arousal (rapid heartbeat and trembling). Added to this is the cognitive label (associating the physical reactions to fear), which is immediately followed by the conscious experience of the emotion (fear).

   The immediate environment plays an important role in how physical responses are identified and labeled. In the example above, the dark, lonely setting and the sudden presence of an ominous stranger contributes to the identification of the emotion as fear. What would happen if you were walking toward your car on a bright sunny day and an elderly woman began to approach you? Rather than feeling fear, you might interpret your physical response as something like curiosity or concern if the woman seemed to be in need of assistance.

Cognitive Appraisal Theory

According to appraisal theories of emotion, thinking must occur first before experiencing emotion. Richard Lazarus was a pioneer in this area of emotion, and this theory is often referred to as the Lazarus theory of emotion.

According to this theory, the sequence of events first involves a stimulus, followed by thought which then leads to the simultaneous experience of a physiological response and the emotion. For example, if you encounter a bear in the woods, you might immediately begin to think that you are in great danger. This then leads to the emotional experience of fear and the physical reactions associated with the fight-or-flight response.

Lindsey activation theory.

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Description

Also known as 'Arousal Theory', activation theory describes how mental arousal is necessary for effective functioning in that we need a certain level of activation in order to be sufficiently motivated to achieve goals, do good work and so on.

The Yerkes-Dodson Law points out how people need a certain amount of activation to be motivated but not have too much stimulation. We have an upper limit to activation, beyond which we become overly stressed and fall into satisficing.

People will seek activation through different types of stimulation, including novelty, complexity, variation and uncertainty. At a low level of activation, performance is decreased due to three factors:

- A lack of alertness
- Dulling of the senses
- Limited muscular coordination

These in turn can lead to increased error or accident, and slower completion of tasks. Underactivation also leads to boredom and seeking of alternative stimulation (including by sabotage), unless the person has a low activation preference, where they are happy to daydream or otherwise be lazy.

Example

A person designing a job considers carefully the level of activation needed and includes just enough challenges and stimulation to keep the job-holder interested but not so much that they get overloaded.

So What?

Using it

When seeking to get people to things for you, ensure the work is stimulating and keeps their attention.

Defending

When others are keeping you busy without any time for yourself, pause and wonder what it is all about.

Cognitive Appraisal Theories of Emotion

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Description

In the absence of physiological arousal, we decide what to feel after interpreting or explaining what has just happened. Two things are important in this: whether we interpret the event as good or bad for us, and what we believe is the cause of the event.

The sequence thus is as follows:

> Event ==> thinking ==> *Simultaneous* arousal and emotion

This challenges the two-factor separation of arousal and emotion, supporting the Cannon and Bard theory albeit with the addition of the thinking step.

In *primary appraisal*, we consider how the situation affects our personal well-being.
In *secondary appraisal* we consider how we might cope with the situation.

This is sometimes also called *Lazarus Theory* or *Appraisal Theory*.

Example

When a colleague gets promoted, I might feel resentful if I think I deserve the promotion more than they do.

So what?

Using it

Demonstrate how what you want people to believe or do is good for them, and explain why.

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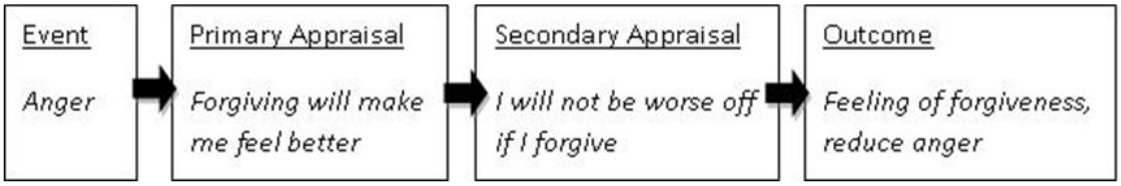
Lazarus's Appraisal Theory

- **Definition**: evaluations related to how a situation will impact one's well being (Lazarus)
  - Benefit appraisal = positive emotion (aka Primary)
  - Harm appraisal = negative emotion (aka Secondary)
  - Active interpretation (appraisal) is the psychological (cognitive) aspect to emotion (aka Outcome) (Lazarus, 1975)



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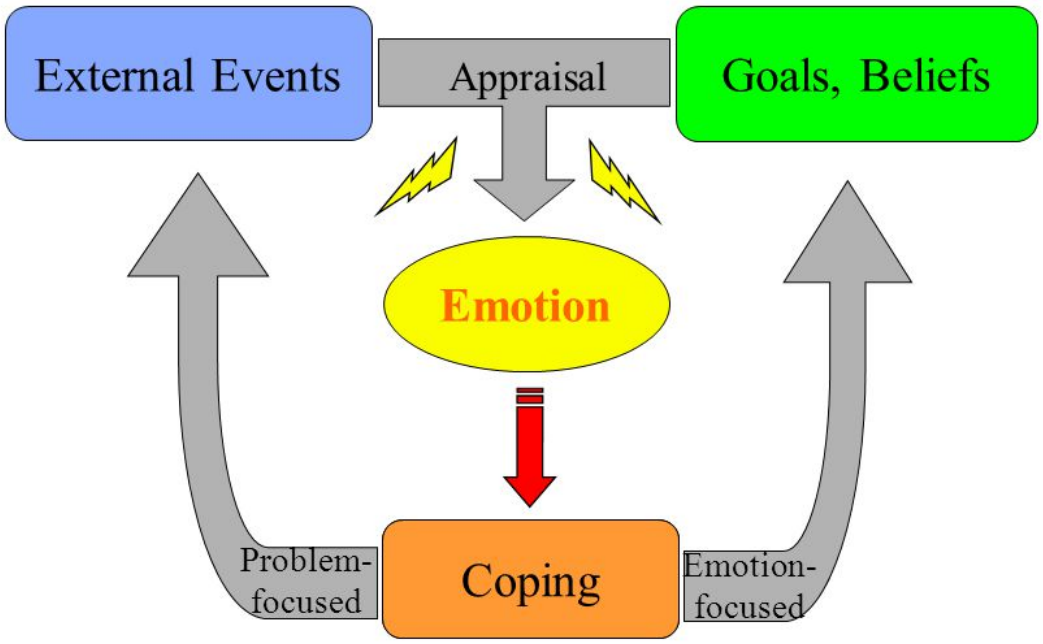
Cognitive Appraisal Theory



Smith and Lazarus' cognitive-motivational-emotive system

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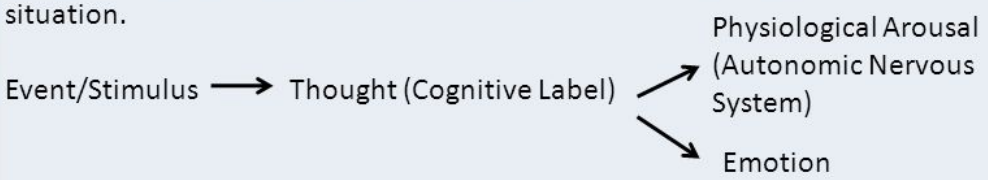
Cognitive Appraisal Theory

Researchers	Richard Lazarus
Definition	In the **absence of physiological arousal**, we decide what to feel after interpreting or explaining what has just happened. Two things are important in this: whether we interpret the event as good or bad for us, and what we believe is the cause of the event. In *primary appraisal*, we consider how the situation affects our personal well-being. In *secondary appraisal*, we consider how we might cope with the situation.  You must first think about your situation before you can experience emotion. Decide on appropriate emotion after the event occurs.
Example	You're walking down a dark alley late at night and hear footsteps. If you do not recognize the person, you might start to feel scared at the **same time** as your heart rate starts to increase.

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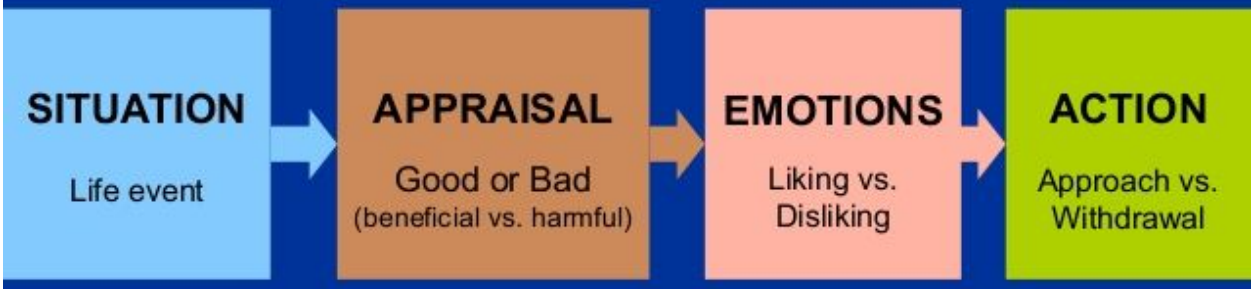
Appraisal theory of emotion

Questions:

- How does the perception of an object or event produce a good or bad appraisal?
- How does the appraisal generate emotion?
- How does felt emotion express itself in action?



Arnold's Appraisal Theory of Emotion

Based on Reeve (2015, Figure 13.6, p. 383)

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- Appraisal Theory
- According to Lazarus (1982, 1991), emotional experience is crucially dependent on cognitive appraisal (the interpretation of the current situation).
- Cognitive appraisal can be subdivided into three more specific forms of appraisal:
  - *Primary appraisal*: The situation is perceived as being positive, stressful, or irrelevant to wellbeing.
  - *Secondary appraisal*: Account is taken of the resources available to the individual to cope with the situation.
  - *Re-appraisal*: The stimulus situation and coping strategies are monitored, with the primary and secondary appraisal being modified if necessary.

Smith & Kirby – Process appraisal: 2 types of appraisal: Reasoning and Associative Processing

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